MASS. EA10.3: 983/7

Bay State Interpret Ear

July 1983

bulletin

GOVERNMENT DOCUMENTS COLLECTION
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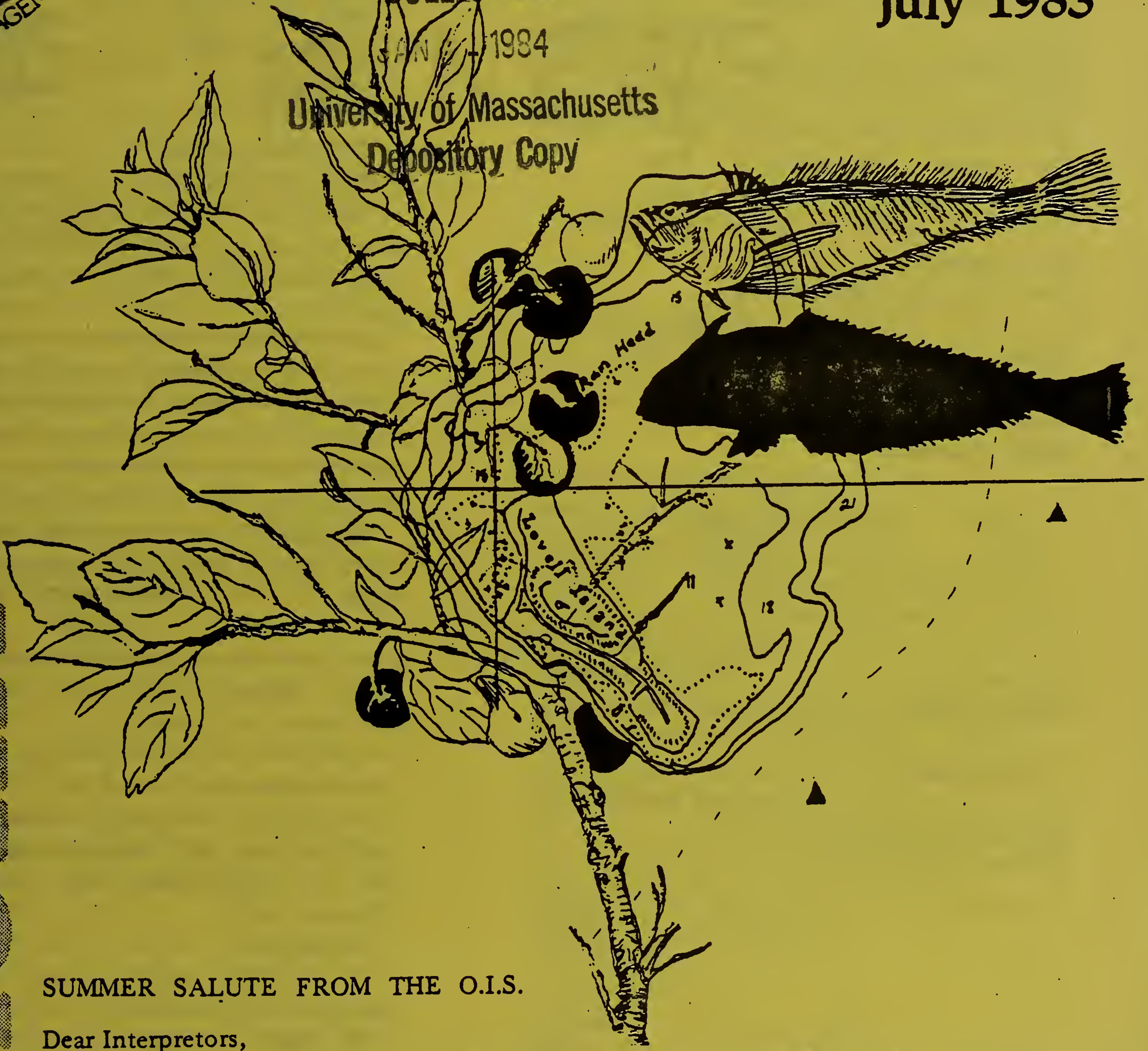


SUMMER SALUTE FROM THE O.I.S.

Dear Interpretors,

Greetings from the 19th floor of the Saltonstall Building. By now you should have settled into giving programs, and people are chomping at the bit to go on them. We've visited most parks, and you're all doing a good job. Keep up the innovativeness!

This first issue of the Interpretear contains some program ideas we've dug out of our files, and some general miscellaneous information that may be of interest to you. Some interpretors have included information about their parks. But, the next two issues of the Interpretear are your big chance to trade ideas, problems, answers, and gripes. So send us your poor, your tired, your homeless ....ooops, wrong speech. Send us your writings, (the more legible the better), and we'll publish you.

Keep up the good work!

Sincerely,

Joshua Heidi Andrea

Office of Interpretive Services
Division of Forests and Parks
Massachusetts Department of Environmental Management
100 Cambridge Street, Boston, Massachusetts 02202

A SELECTED BIBLIOGRAPHY OF BOOKS AVAILABLE THROUGH INTERPRETIVE SERVICES

State Interpretive Handbooks: Massachusetts, California, North Dakota.
Interpreting our Heritages by Freeman Tilden
Interpreting the Environment . . . . .by Grant Sharpe
Interpreting for Park Visitors . . . . by William Lewis
Red Cross Advanced First Aid - several copies
The Shrub Identification Book
The Tree Identification Book
Sierra Club Naturalists Guide to Southern New England
Sharing Nature with Children . . . . .by Joseph Cornell
Simon and Schusters Guide to Trees; Mushrooms.
Fruit key and Twig key - Dover Pub.
Golden Guides to:
. . . . Trees of North America
. . . . Reptiles and Amphibians
. . . . .Non-Flowering Plants
. . . . Pond Life
. . . . Geology
. . . . .Butterflies and Moths
. . . . .Sky Observation
Illustrated Boston Harbor Island Flora . . . . by Dale Levering
A Beachcomber's Botany . . . . .by Perry and Norman
Newcomb's Wildflower Guide
Peterson Field Guides:
. . . . Wildflowers
. . . . .Birds
. . . . Animal Tracks
. . . . Atmosphere
. . . . Insects
. . . . Ferns
. . . . Mammals
The Long Ago Lake by Marne Wilkins- children's activities
How to Tell the Birds from the Flowers
Park Planning Handbook
New England Folklore
Sierra Club Guide to New England's Landscape

If you check a book out, please return it as soon as possible - there's lots of interpretors out there, and not many books!

NIGHT WALKS

Use a small flashlight to "talk" to fireflies.

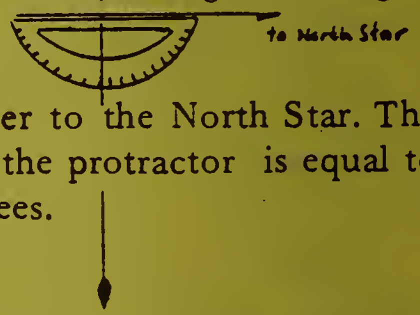
Determine temperature with insects:
Field cricket temperature =
$$\frac{N-50}{4} + 50$$
Katydid temperature =
$$\frac{N-19}{3} + 60$$
N = chirps/minute
Snowy Tree Cricket temperature = Number of chirps/15 seconds + 40.

Answers will vary due to humidity and individual insect, but generally accuracy is in 6% range.

- Above is from "The Environmental Interpretor" by the Environmental Education and Interpretive Section, PA. Department of Environmental Resources, Office of Resource Management, Bureau of State Parks.

Finding your latitude,(finding the North Star).

Equipment : A clinometer, which can be made from a protractor, string and weight, thusly;



Point the clinometer to the North Star. The degree reading on the protractor is equal to the latitude in degrees.

Constellation cans.

Equipment : Empty number 10 cans (with bottoms on), various sized nails, hammer, flat black paint, paint brushes, and a reference book.

Procedure :

1. Paint the inside of the can (bottom and sides) with the paint.
2. Draw the desired constellation (to scale) on a piece of paper, and glue to bottom of can.
3. For each star, punch a hole in the can with a nail. Different sized nails can be used to represent varying atar magnitudes.
4. Canmay be labeled with the name of the constellation, time of year visible, location, mythology, special features.
5. Hold can to light or flashlight to see constellation.

- Above from L.I.F.E. Manual, George Williams College, Williams Bay, WI.

SKINNING SMALL MAMMALS, BIRDS AND REPTILES.

A useful, but occassionally disgusting, technique. Hold your breath, and don't be afraid to get your hands wet.

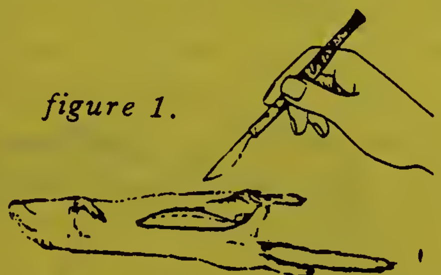
A few practical tips :

1. You need a Salvage permit from DEM Division of Fisheries and Wildlife, 100 Cambridge St. Boston, MA. 02202, in order to pick up road kills.
2. Animals killed during the summer will rot quickly. If skin seperates easily from muscle, body is covered with lice, eyes are eaten, (Oh my God), or smell is bad, leave it to your friendly decomposer.
3. Be prepared with a sharp knife, scissors, hack saw, cotton or polyester batting, salt or borax, a dry sunny area for drying where animals won't get to the end product.
4. If you can't skin it immediately then freeze it immediately.
5. Animals that are too mangled to use as a whole may have parts that are useful, e.g., feet, wings and tails, can be dried easily. They should be tacked onto a board in the position you desire, and allowed to dry for 1-2 weeks.
6. Cornmeal can be used to absorb fluids during the cutting. Be sure it is removed when finished.
7. It helps to read instructions through a couple of times and know them, rather than refer back to them as you operate.
8. Any animals brought back to life during surgery should be freed immediately.

What to do :

1. For birds and mammals begin by making an incision on the stomach from the area where the neck meets the body, down to an area just above the "excretory" region (see figure 1).

figure 1.



Cut only the skin, not the muscle and bone, unless you like guts, blood, and the contents of the lower intestine on you and the skin. Be especially careful as you reach the area of the lower intestine as it is thinly covered and breaks easily.

2. Begin to peel the skin away from the incision. You want only the skin - no fat, blood vessels, etc. This can usually be done by pulling with your hand. However, if it seems as if the skin will break (particularly with birds), the seperation of skin from muscle can be facilatated by cutting the connecting tissue with a knife as you peel with your hand.

When you reach a point in the peeling where the legs (or wings) appear, you should push the leg out of the skin, somewhat like taking a sock off your foot (see figure 2 and 3).

figure 2.

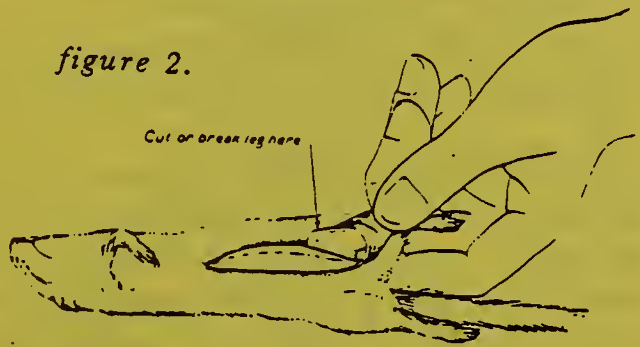
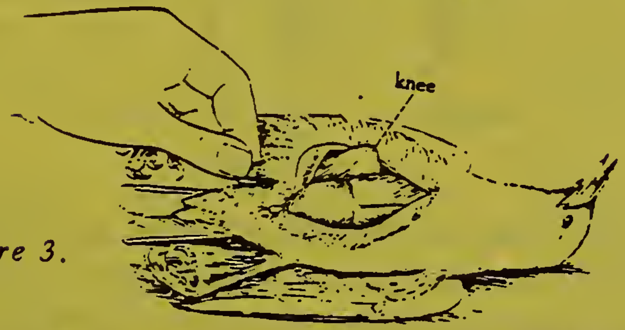

Cut or break leg here

figure 3.



For legs, you should push back the skin until you reach the foot, then cut the bone (scissors for smaller animals, hack saw for larger), leaving the foot attached to the skin. An alternative to this is to cut at the knee, then remove all the flesh from the bone (as seen in figure 12). This gives more body to the finished product, but requires more work.

For wings, peel as far as you can and then cut the bone (see figure 4).

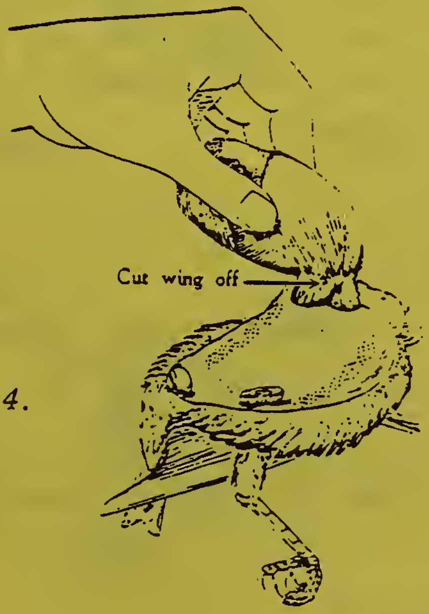


figure 4.

3. After the four appendages have been cut, peel off the skin attached to the animals back. Thus for mammals, skin will now be attached at the head and tail, and for birds, the head and the muscle of the tail feathers.

4. For mammals, begin to peel and pull the skin of the tail, as you did for the legs. If you then grasp the tail (the furry part) with one hand, and the muscle/bone part of the tail with your other hand, and pull slowly and forcefully, the muscle/bone section should slide out of the skin (see figure 5).

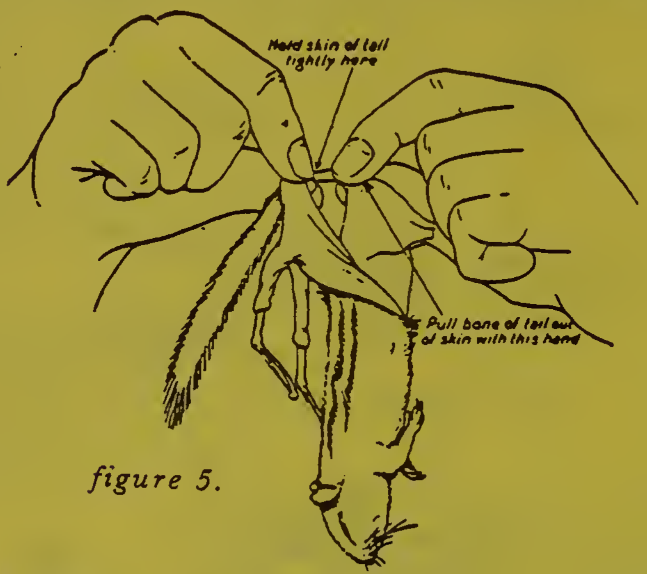

Hold skin of tail tightly here
Pull bone of tail out of skin with this hand

figure 5.

For birds, peel back the skin around the tail feathers, and then cut the muscle which holds them in place (see figure 6 and 7). If you peel the skin back too far, and cut, you will cut off the tail feathers. Be attentive. I have a tailless robin.

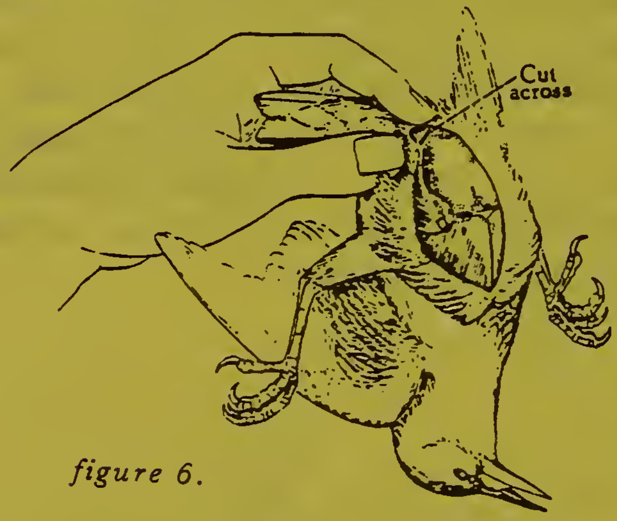


figure 6.

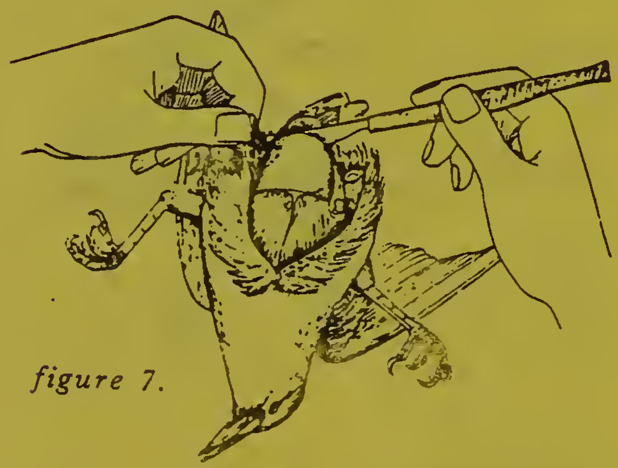


figure 7.

5. Now you have to remove the skin from the head. For mammals this requires pulling and cutting with your sharp knife. Be cautious around the eyes, ears, and mouth. These areas may rip easily, or, you may not remove all the skin (see figure 8). This procedure will leave the skull behind, which is probably just as well.

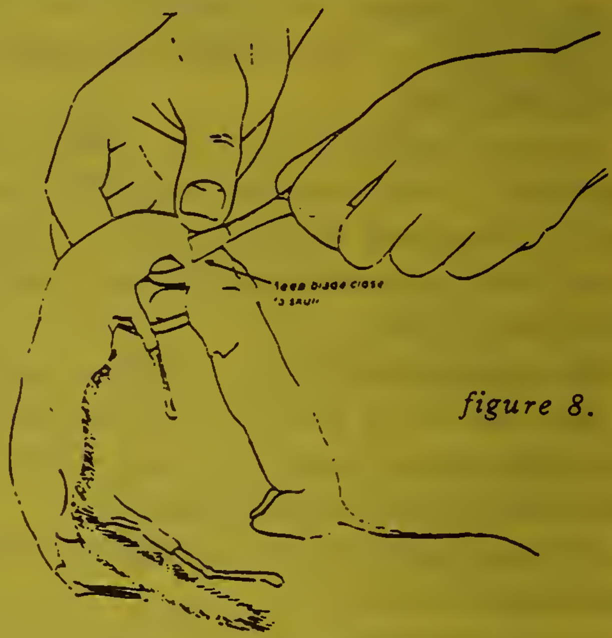
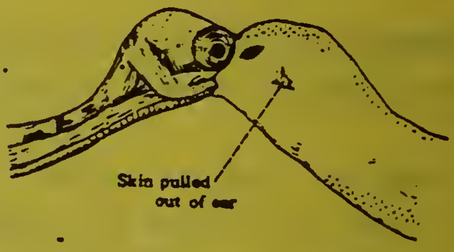

Keep blade close to skull

figure 8.

For birds, it is easier to leave the skull with the skin, and thus keep the beak. To do this, peel back the skin over the head, as you may have done for a mammal (see figure 9).

figure 9.


Skin pulled out of ear

BUT, stop when you reach the beak (as in figure 9). It is then necessary to remove the eyes (see figure10), and then make an incision in the skull (see figure11), and remove the brain. These areas should be well cleaned, and then salted or boraxed, and stuffed with cotton or polyester batting. Then slide the skin back over the skull.

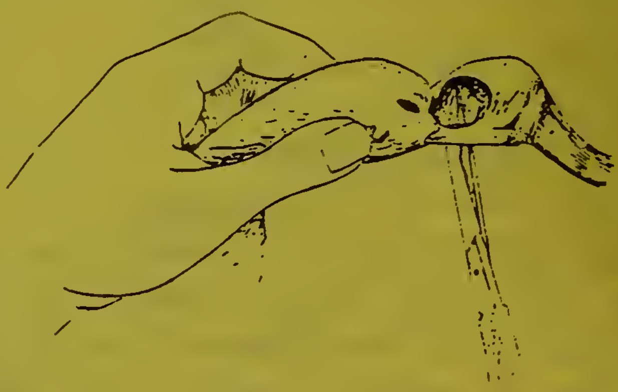


figure 10.

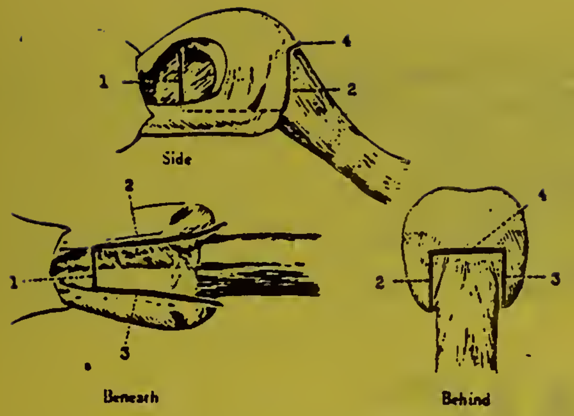


figure 11.

So now you have a bird or mammal skin. The mammal can be turned inside out (see figure 12) and salted, allowed to dry for a week or so, and then turned right side out. If you're into stuffing and sewing up, more instructions are available from at the Interpretive Services office.

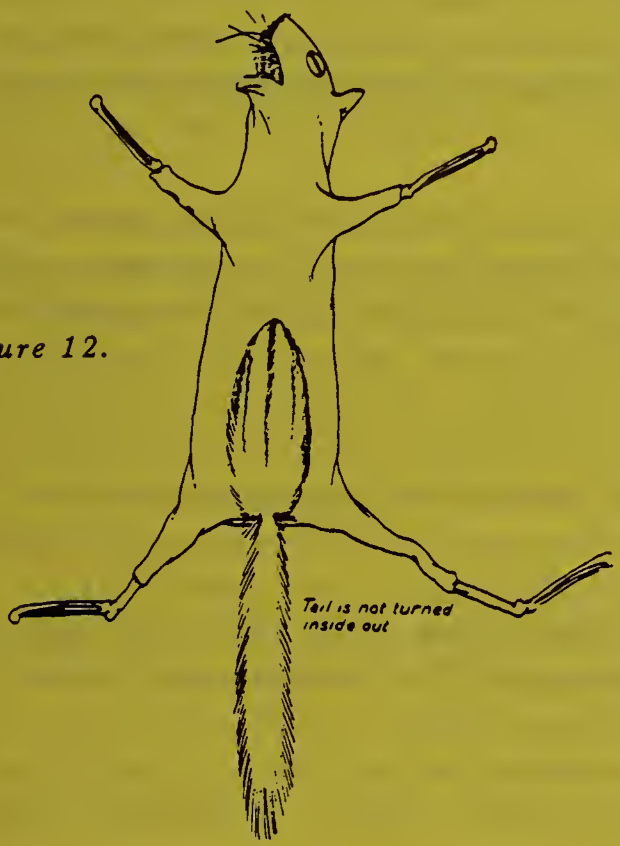

Tail is not turned inside out

figure 12.

The bird skin can be salted or boraxed, and left to dry, and then stuffed and sewed. You might consider spreading the wings (or one wing) out, pinning them to a board, and allow them to dry in that position.

Snakes and eels can be skinned easily by cutting off the head, making an incision down the length of the stomach, grasping the skin with a pair of pliers and pulling. Tack 'em down to a board, salt, and allow to dry. Anybody out there done lizards or frogs and such?

Speaking of heads, animals (or parts of them) that you don't or can't skin, can be easily preserved in old jars, when covered in isopropyl alcohol. The alcohol should be at least 85%. Avoid "hardening" a specimen by using alcohol that is too strong, but beware of a weak solution in a hot climate.

Have fun.

(Illustrations from The American Museum of Natural History, Guide Leaflets No. 58 and 61, *The Preparation of Birds for Study*, 1929, and, *The Capture and Preservation of Small Animals for Study*, 1931).

GREETINGS FROM GREAT BROOK FARM

I.T.I. .... Internatonal Tire Incorporated
no .... Insect Telapathy Instruction, closer
.... Interpretive Training Institute ,YES!

After a month of rainy weekend walks, a longing for sunny, warm weather and a need for an interpretive "pick-me-up", I enthusiastically looked forward to this year's Interpretive Training Institute. Driving down Rt. 86 with a van full of Interpretors and one stowe away named Sundance, I couldn't help but wonder if this years session would live up to it's reputation. as a continually improving, quality Interpretive Training Period. Well after 4 days of deliberation the verdict was easily rendered. OUTSTANDING! is probably the one word that is indicative of the way I feel about the experience with the exception of the "camp chow" which unfortunately didn't quite make the grade.

Instead of rambling on with camp stories of I.T.I. I'd like to share with you a few of my random memories . . . . An interesting and exciting talk from our Director of Forests and Parks, Gil Bliss, on the importance of it . . . . . Pre-Dinner Ultimate Frisbee . . . . Those refreshing swims on the pool. . . . . . Butterflys. before your segmented walk (similar to the feeling you had before your swim test at camp!). . . . . . Renewing old aquaintences and making new ones . . . . the good rapport between the Managers and the Interpretors. . . The magic of Dave Sobel and the advanced Interpretors in creating an hour of Education and Entertainment . . . . Alberto, that fast moving, Bearded Ball of enthusiasm from Connecticut. . .Al Hendry's camp fire story . . Josh's bird skinning lesson. . . . The impressive showing from the Department. . . . . . And our faithful, fearless leaders from Boston, Josh, Heidi, and Andrea. If we're not ready for the public now we'll never be!

See you all at Midsummer.
Brad

The I.M. NEWS

(Selections from an informal newsletter, written by the Island Managers of the Boston Harbor Islands State Park).

INNOVATIVE INTERPRETATION
As a recent (very recent) graduate of a fine eastern untiversity, yours truly has returned from his first "daze off" with sheepskin in hand and ideas in mind. If I may, I believe it would behoove us as colleagues in the field (which one?) to brainstorm a bit here and discuss the gamut of programming possibilities that we might avail ourselves (and our visitors) of. The following is just a smigen of the aforementioned gamut that I have come up with while lounging about the Lovell's gazebo!

RATFEST. I decline to spend too much time or ink with this dubious idea. But the concept is quite simple: the Ratfest would be in the genre of the Harborfest, Summerfests, Octoberfests, or Beerfests with which we are all familiar. Games, venders, contests of skill and dexterity, works of art and craftmanship would be created and displayed. All with that RATTUS NORVEGICUS theme. Rumor has it that Spectacle Island is making a big push to host this event. Enough said.

LOW TIDE MUD FLAT SPRINT. This concept is an interesting one with certain geographic limitations. An island must have a good, long sandspit exposed only at low tide. I'm sure the MDC or Corps of Engineers, or an enterprising troop of boy scouts could construct one in a few days, if you were REALLY interested. The object is to place a bouy, marker, full six pack, or something at the end of the spit. Contestants would begin the event the event from a mass start on the beach. They would spring out to the point (of no return) and back before the trecherous tides of Boston Harbor swirled about and swallowed their worthless bodies. If the spit is too short, or the contestants too fast, do the course in the form of a shuttle run or relay race. Just keep experimenting until you feel the event is challenging enough.

BOOZE CRUISE BOMBARDMENT:
Out here near the "outta habba" we have a high number of booze cruises sloshing by at all houres of the night blaring live and taped music across the "habba" which intrudes upon my personal space as well as the privacy of our campers. I thought it would be a good chance to mobilize the campers for an active evening program by disposing of these noisy pests. After dinner we could gather on the beach and construct long-range slingshots. We would then wait patiently, huddle in the beach grass, until the enemy slithered through the narrows. Whereupon we would use our newly constructed slingshots to propel flaming peak 1 backpacking stoves, lanterns and fuel bottles. I feel there is also a possibility of some good living history with the gun emplacements here if we can only get a few more degrees of elevation from the slingshots. As for now we'll stick with beachfront assaults.

DISCLAIMER: The aforementioned concepts are not the opinions held by the DEM, MDC, EIP, or its employees, relatives or friends. Only the warped ramblings of a certain sardonic individual.

Dick Doucette---Lovell's Island

"GURGLE, GURGLE, SWOOSSSSSSHHH, PHSSSHHH!"
Ah, I'll bet you all haven't heard those sounds in a while. Well, I thought I'd just give you a little treat from Peddock's. Here it goes again - "Gurgle, gurgle, swooossshh, phssshhh." These are, as I'm sure you all know, the healthy sounds of running water - flush toilets included. I don't mean to rub it in that we have fresh water flowing out of our ears, I just thought you all might appreciate a few of the sounds of such luxury. Besides you guys really would not want such technology - the toilets always overflow.

Lisa Hayes------Peddock's Island

A GLIMPSE AT ISLAND MANAGER LIFE

Dear Mom:
I'm having a great time here on the Camp Hubba Islands. Sorry I haven't called, Mom, but I seem to only have radio contact with the Harbor Police and the seagulls on Great Brewster. I thought I'd be lonely at first, but soon the boat people started arriving from the main land, and there's plenty of company now.

So you wanted to know about my island. What can I say? It turns out there are no coconut groves, no swingers from Club Med. But there are LOTS of sea shells, lots of birch trees and big birds like hawk and pheasant. And the view of Boston from the top of the bluff - it's totally awesome!

The People are really friendly here. I shouldn't tell you Mom, about all the stuff I've been offered, but if I took a teeny part of it, I don't think I'd be writing this letter. Even the hard partying types have their hearts in the right place, though their heads might be bobbing out in the waves!

That reminds me, Mom, do you remember last year at Christmas I asked for a boat and you said maybe I could have one someday? I wanted a nice sailfish, remember? Well, I've changed my mind. I decided after watching motorboat dragsters out there all weekend, I'd rather take up a safer hobby. Like sky-diving.

Well Mom, that's about all for now. I really miss all my friends from school. But luckily nobody is an island, only islands are islands. Send them all my warm cheers.

Love, Don---Don Swann----Grape Island

FYI

for your information

Midsummer Training. "Be there or be square".
Date: July 25, Monday.
Time: 10:00 AM.
Location: Harold Parker State Park, in N. Reading.
Activities: Trading ideas for programs/exhibits, comparing tans, eating and drinking, drinking and eating, fun and games.

Other dates to keep in mind:
Interpretear articles due on July 25 and August 19.
Park Festival Week is August 6 - 13.

Programs and Events with the New England Wildflower Society. Programs include: Botany for Photographers, Lichens Workshop, Vermont Wildflower Farm, Poets Walks, Block Island Study Tour, Mt. Monadnock, Mud Pond Bog, Terrible Mountain Day, Camls Hump, Capriland Herb Farm (Harvest Tour), September in the Pine Barrens.
More information from the Society. Call 617/237-4924, or, 877-7630.

Programs and Events with Blue Hills Interpretive Centers. Programs include: Wild Fire in the Blue Hills, Animal Tools, Life in the Pond, Living Dinosaurs, Animals Nobody Loves, The Night Sky: Sounds and Sights, Great Blue Hills, Herbs: Healthful and Harmful, Tour of the Old CCC Camp, Frog Watch, Moonlight Serenade, Great Dome Trail at Dawn, Quaking Bog Trail, Meteor Shower Watch/Potluck, Family Sing Along Campfire, Wild Tales. For information call Trailside Museum, Tuesday - Friday, at 617/ 333-0690.

Woodpeckers drum to proclaim their territory, just as most birds sing for that purpose.

The Perseid Meteor Shower occurs from approximately July 20 to August 17. The best viewing time occurs from August 11 - 13. All meteor showers are seen best after midnight.

Environmental Intern Program Conference.
Date: July 15 - 16.
Place: Pine Manor Lodge, Brookline, MA.
Time: 9 AM - 5 PM.
Title/Theme: "Yankee Ingenuity and the Pursuit of Environmental Solutions".
More information from EIP/NE, 1029 Statler Office Building, Boston, MA. 02116.

Interpreting for Park Visitors., by Bill Lewis can be purchased for $1.95. If you're interested, bring $2.00 ($.05 for shipping) to midsummer training.

Massachusetts Audubon Reports:
The faster a bird flies, the faster it breathes. With each wing beat the pectoral muscles press against the ribs forcing the bird to breath.
When a bird flies, in order to reduce air resistance on the upstroke, the upper surface of its wings becomes convex, the wings partially fold, and the flight feathers seperate to let air pass through them. On the downstroke the opposite occurs.
When a hummingbird is at rest its heart may beat 400 times a minute. Its heart beat 1,000 times a minute in a stressful situation.
The parasitic brown-headed cowbird has lost the instinct to build a nest. It lays its eggs in the nests of other birds.
Pigeons originally lived among the cliffs of Europe, North Africa, and Asia. They were brought to Nova Scotia by colonists in 1606.
It is estimated that more than 500 species and subspecies of animals and plants have become extinct in North America since the arrival of the first colonists in the New World.
Biologists estimate that, worldwide, one to three plant or animal species become extinct each day. The destruction of habitat is believed to be the principal cause.
Some organs of marine animals are used for medical research. The livers of the nurse shark and dogfish are studied for hepatic disease, the eyes of the skate for night blindness, and migratory Pacific salmon for arteriosclerosis.
In southern New England coastal waters, plastic particle resulting from the refining of oil for fuel have been found in the stomachs of eight species of fish. Some of the particles found were as large as ¼ inch square.

Connect is the UNESCO-UNEP environmental education newsletter. It contains articles and information on EE around the world, including announcements of publications and meetings. For example, the March issue was entitled "A Roundup of Country Reports on Environmental Education." Under publications, material available included a printed report on the International Conference on Environmental Education, held in New Delhi, India, 16-20 December, 1981. Itis available by writing Dr. Desh Bandhu, School of Planning and Architecture, Indraprastha Estate, New Delhi 110002, India.
Connect is free. You can get on their mailing list by writing them at 7, place de Fontenoy, 75700 Paris, France.

Home Bird Photography Course, offered by Cornell University. Information from:

Photography Department, Laboratory of Ornithology, Cornell University, 159 Sapsucker Woods Road, Ithaca, NY. 14850. 607/256-5056.

The *Association of Interpretive Naturalists, Inc.*, is a nationwide professional group of interpretors. Membership includes the bimonthly national AINewsletter, the professional journal "Journal of Interpretation", automatic membership in the regional organization, national conferences, etc. Membership applications are available from Peggy Van Ness, AIN Central Office, 6700 Needwood Road, Derwood, MD. 20855.

Interpretation as a Management Tool, a study done by the Ohio State University at Ohio Department of Natural Resources Natural Areas, is available in a nine page summary report from, Jennings Environmental Education Center, RD 1, Slippery Rock, PA. 16057 (send self addressed, stamped envelope).

JOBS?

The following are publications that list positions, or organizations that have had jobs in the past, that might interest interpretors. Interpretive Services does not have any affiliations with these organizations, but we wish you the best of luck. Anybody out there have other suggestions?

Environmental Opportunities, Published monthly at $20/6 months. Write: Environmental Opportunities, P.O. Box 670, Walpole, NH. 03608.
Jobs Clearinghouse. Published by the Association for Experiential Education, at $6/year for members, $15/year for non-members. Write: AAE, Box 249-CU, Boulder, CO., 80309.
Opportunities. Published by the Natural Science for Youth Foundation. Membership is $25/year (includes Opportunities), or $20/year for Opportunities alone. Write: NSYF, 763 Silvermine Road, New Canaan, CT. 06840.
Conservation Directory. Published yearly by the National Wildlife Federation, for about $7. Write: NWF 1412 16th Street, N.W., Washington, D.C. 20036.
Telephone listing of job opportunities. This recording is made available by the Association of Interpetive Naturalists. Please call AFTER working hours, i.e., 5 PM to 9 AM on weekdays, or any time on weekends. The number is 301/948-8844. The recording lists positions alphabetically by state - be prepared to write quickly.

Internships/Seasonal Work:

Atlantic Center for the Environment
39 South Main St.
Ipswich, MA. 01938
(Environmental Internships).

Environmental Intern Program
629 Statler Office Building
Boston, MA. 02116
(Environmental Internships).

Manomet Bird Observatory
P.O. Box 936
Manomet, MA. 02345
(Teaching/Research Internships).

Otter Lake Conservation School
Greenfield, NH. 03047
(Residential Environmental Education).

George Williams College
Resident Outdoor Program
Box210
Williams Bay, WI. 53191
(Residential Outdoor Education).

Goddard Riverside Community Center
161 West 87th
NY, NY. 10024
Attn: Director of Environmental Education, Goddard Riverside Camp.
(Residential Environmental Education).

Sargeant Camp
RFD 2
Peterborough, NH.
03458
(Residential Outdoor Education)

Squam Lakes Science Center
P.O. Box 123
Holderness, NH.
02771
(Education Internships)

IS THERE A REASON FOR EVERYTHING?

The world is so constructed that there must be a reason or cause for everything. There are so many forces in the world that man has not yet been able to locate the original cause of every one of them. Concerning other things, he sees the effects without having any knowledge of the forces which are their cause. Other things he has never even bothered to inquire about, but simply takes them for granted. But every force, which means, of course, everything in the world, must have had a beginning and therefore something or a combination of things must have caused it to begin, and the thing or things that caused it to be is the reason for its being. Every little while someone makes a discovery of some new force, and then we suddenly realize that this force has been in existence all the time although not known to man, and we discover through this the reason for many other things being as they are.

The other thing or side of the question is also true. We cannot have a cause without an effect. You cannot do anything without causing something to happen and producing an effect on one or more other objects either animate or inanimate. You cannot move your hand without creating some disturbance in the air. When you make a loud noise, you produce sound waves. When you burn a stick of wood, you create smoke, ashes and gases of various kinds. 'You change the whole nature of what was the piece of wood, and yet no partical of what made the stick of wood is ever destroyed or lost, but appears in some other thing in the air or on or in the earth.

According to the *Book of Wonders, 1915*

CRANBERRIES, CRANBERRIES!

Cranberry World (Ocean Spray) in Plymouth, Ma. is free and open to the public. They have wonderful displays; visuals, audio, great quotes & research. If you call public relations, they will lend you a short slide show. You may want to use it as is, or combine parts of it with your own research.

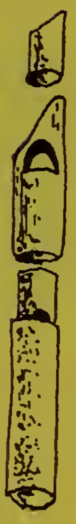
Jennifer Beaven
Nickerson State Park

LEAFPRINTS

1. Use acrylic or oil base ink
2. Roll it out on a smooth surface until it is tacky.
3. Place leaf vein side down & pat with fingers - check by lifting & looking to make sure the leaf is thoroughly inked.
4. Place leaf ink side down on paper or a t-shirt (I supply paper and let people supply their own t-shirts).
5. Place a sheet of paper over it and make sure the leaf doesn't move while you rub to transfer the ink.
6. Lift off the paper and leaf. Both can be re-used.
7. Talk about leaf I.D.; conservative careful picking and use.

HOW TO MAKE A HICKORY WHISTLE

Materials:
1. Pocket knife. 2. A green hickory stick one half inch in diameter and six or seven inches in length
Method:



Cut off one end of the hickory stick at a 40 degree angle. Cut a notch one quarter inch deep sloping toward the long point of the end. About three inches back from the notch, cut through the bark all around the hickory stick. Then tap lightly so as to loosen the bark, but not break it. Hold the stick in the left hand and twist the bark off the whistle end. Cut the stick off where the notch was cut, being careful not to break or split the short piece. Split or shave off about one eighth inch of the top side of the short end for an air passage. Slip the piece of wood back and fit it back in its original place. Then slip the long end of wood about an inch into the bark, being careful not to break the bark. The whistle is now ready to blow.

By Anna King Davis
Junior Natural History Magazine
September 1951.

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DEPARTMENT OF ENVIRONMENTAL MANAGEMENT MASSACHUSETTS 1898

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Bay State
Interpret Ea

August 198

bulletin

MIDSUMMER LOW-DOWN

Dear Interpretors,
It was great to see you at Midsummer Training. Your ability to solve problems in the face of extreme adversity, not to mention having your hands and legs tied together, is truly astounding. If you have any comments on how future trainings could be improved please let us know.

This issue of the Interpret Ear contains some things written by you, but not nearly as much as we would like to see. Not only does writing an article let us know that you are a functional literate, but it's a chance to spread your wisdom throughout the state. Inter-interpretor communication is often poor because of the distances between parks, and we want you to use the bulletin to improve the transmission of ideas, problems, successes, failures and the state of the economy.

For those of you who will be around after Labor Day, we are hoping to gather for some fun, (no rope or tape this time), on a Whale Watch. If you have suggestions for dates let us know.

Keep up the good work!

Joshua Eric Heidi Andrea

Office of Interpretive Services
Division of Forests and Parks

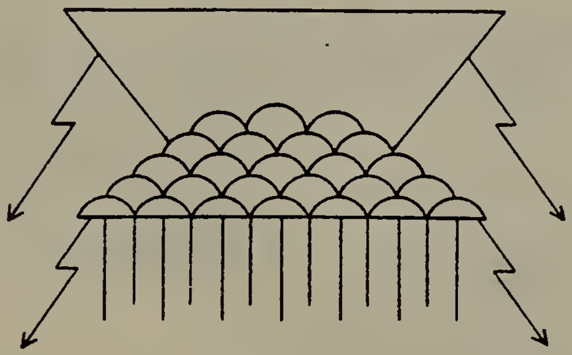
STORM

I was just saying how
I'd like to see the weather break
and now the weather is breaking
too quickly for me.
I make a feeble attempt
to gather my things,
as gulls come in from the sea.
I wonder
if this is how death must be:
Your noticing a different something in the air,
and then, upon you all at once, the storm -
sumacs sway,
and wild carrots dance beside the sea.
You hear the humm of engines
coming into shore
the gulls fleeing from beyond the furthest light
You feel closer to the night
than you have ever felt before.

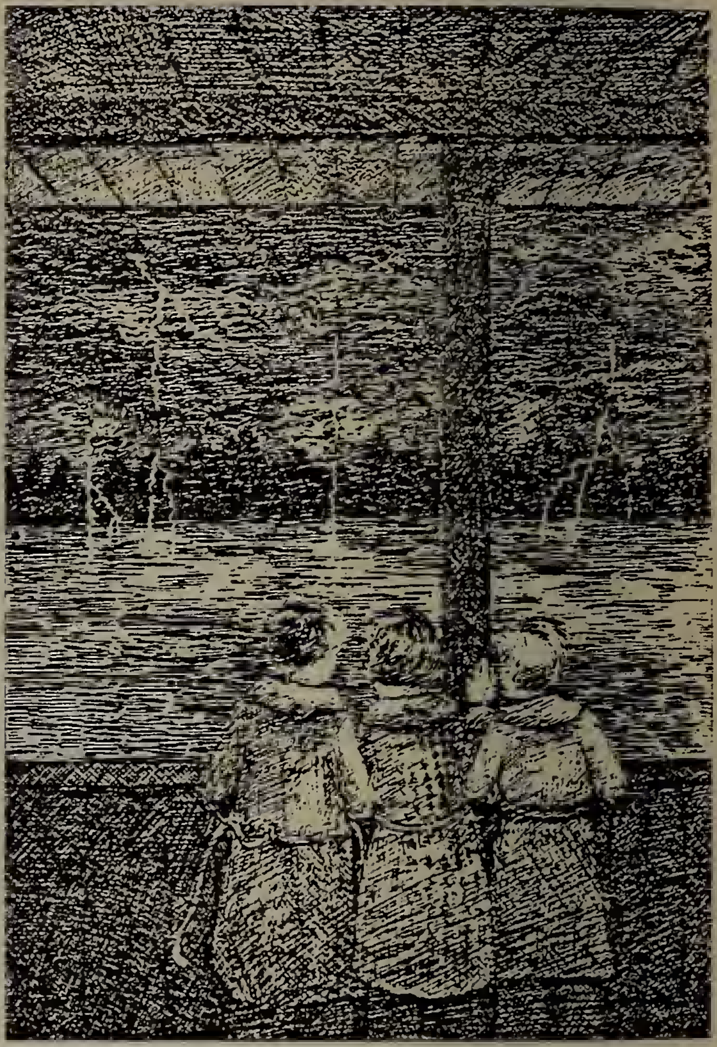
When the pressure drops,
you taste it in the air, like dampened chalk.
Every gust that sweeps across
is like a hundred thousand whispers in your ear,
and what they whisper is -
we'll wait for you. Stay here.
Even the hornets are seeking cover.
I batten down whatever there is
that must be left outside,
yet knowing nothing will ride
this storm out.
At last I give up,
wach the sky spit rain;
curl my neck backwards
and gaze off into the greyness of those eyes.

Some say hail will do us in tonight,
Some say winds of 60 knots;
I guess this is how the end must be -
The sumac's tall
and tossing against the sky.
The sea of leaflets
as they fall.

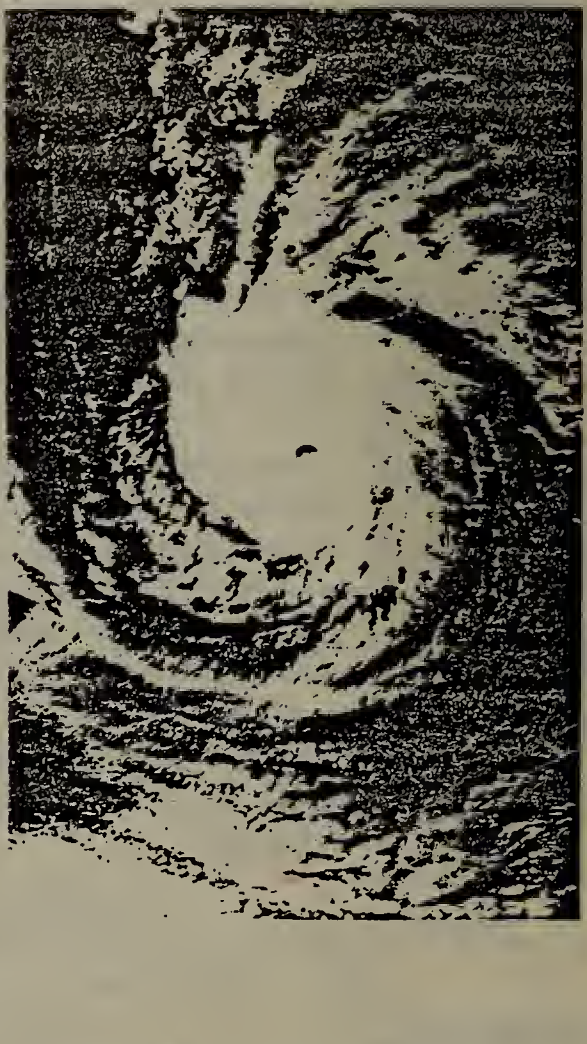
Don Swann
Grape Island



Symbol of a thunderstorm used by the Navajo of northern Arizona and western New Mexico. The heap clouds, anvil top of ice crystals, precipitation, and lightning form an elegant portrayal of this spectacular type of storm, common in the summer and essen-



We watched the lightning dance around the lake.



View of Hurricane Ava over the eastern Pacific. Eye of storm shows it to be the center of a huge vortex with spirals of cumulus and altocumulus and cirrus moving toward center. 6/7/73

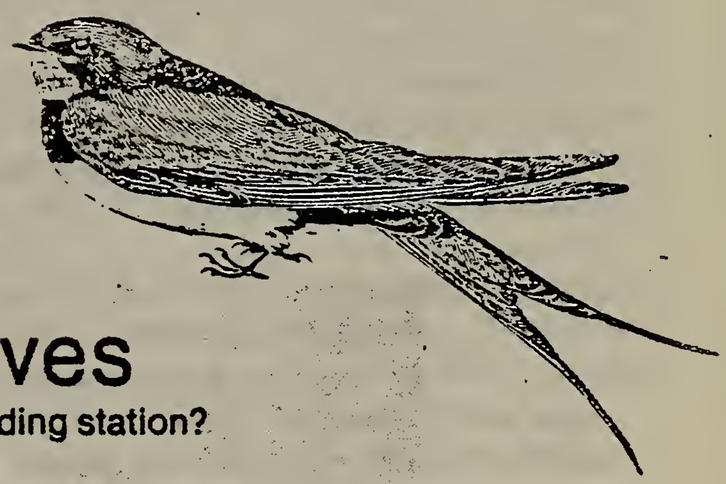
CLUES FROM DR.JEKYL/MR. HYDE

Serenity. There's no other word which describes the mood settled in the forest. "Settled" because it is as if a fog blanket moved in, noiselessly changing the atmosphere, subduing the air, and ridding it of any static or charge. Like fog, it is only temporary, so I am quick to pull up my chair on the pine needles. It is time to woo the Muse; it is Sunday evening, the visitors have gone home.

My active self, the one who led walks, sang campfire songs, held children's hands, and smiled incessantly all day, retreats. There is a Dr. Jekyl/Mr. Hyde transformation as I move from the role of teacher to that of student. There, I pretended to know something; here, I acknowlege my ignorance. I might, as Annie Dillard said, "learn something of the purity of living in the physical senses and the dignity of living without bias or motive." She said she went to Hollings Pond "not so much to learn how to live as, frankly, to forget about it." I begin to forget. The process of forgetting does not come easily, though. My mind was carefully trained to remember, to continually pursue, to dissect and to analyze; it cuts and it cuts, a sharp knife in pursuit of the perfect slice.

I gather my belongings and immediatly think about the next day's activities. I reprimand myself then, less I forget, recall that the two worlds feed one another. The dual existence is essential; one could not survive without the other. This is, perhaps, a symbolic relationship.

Therese Lawless
Harold Parker State Forest



Nature Detectives

Can you find the 'hidden' visitors to our bird feeding station?

A S D F G H J K L G U I O P W E O W I Q U A S D F G H J K
Q A W S E D R F R R T G Y H U J I K O L P A S D A S D F G
Z X N D B L U E J A Y C D V F B G N H J M K L O I U Y T R
Q A U W S H A I R Y W O O D P E C K E R Q A Z X S W E D C
O L T L K J H G F S Y T R E W W H E D S A M Q A Z X S C D
L K H J H G F D S Q A Q E V E N I N G G R O S B E A K S T
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Q O W I E U R Y T E L A K S J D E H F J D N A K S J W H E
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A I S U W Y E T S G A H G O L D F I N C H E S J N H V S G
Q O W I W U E Y W T S G A C S B X N S H U S J U Q A G T S

Blue Jay, Cardinal, Chickadee, Chipmunks, Evening Grosbeak, Field Mice, Goldfinches, Gray Squirrel, Hairy Woodpecker, Mourning Doves, Nuthatch, Tufted Titmouse..

THE GALAXY

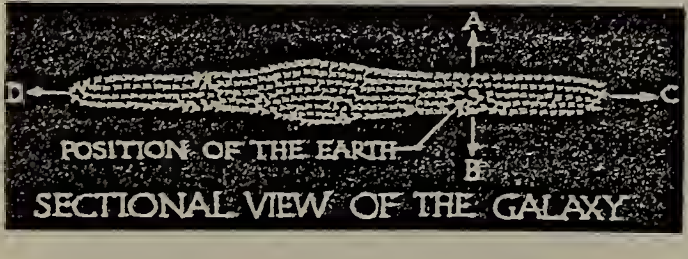
Stars, even the nearest ones, are so far away that it is almost impossible to imagine distances so vast. But what about thosestars that are still farther away? Are they scattered at random through space, or are they arranged in groups with a definite pattern?

That question has interested astronomers ever since the earliest days. In ancient times, people imagined that the stars were all the same distance away, and were fastened to a vast dome with the Earth at its center. Of course we have known for a long time that this isnot so. Actually, the stars vary enormously in their distances from us.

Back in the eighteenth century the great English astronomer Sir William Herschel worked out a theory as to the arrangement of the stars in space. With some modifications, his idea is still accepted today. In the formation of his theory the Milky Way played an important part. Are you familiar with this beautiful appearance in the sky? It is impossible to see it from the city, because it is hidden by the glare of the street lights; but if you are out in the country on a clear dark night, when the moon is not shining, you may see an irregular band of faint cloudy light crossing the sky.

Its position varies in different months. It is seen to the best advantage on a summer evening, when it arches across the sky from north to south. The southern part of it is especially brilliant. If you look at the Milky Way through binoculars, or even opera glasses, will see a thrilling sight. What had appeared as just a cloudy light, is now revealed as thousands and thousands of stars, too faint to be seen individually without the glasses. This appearance of the Milky Way gave Herschel a clue to the arrangement of the stars in space.

This was his idea: All the stars that we can see are arranged in a definite group, a round, rather flat disk, something like a cookie. We ourselves are not at the center of the cookie, but part way out toward one edge. Now (imagining that the cookie is lying flat) supposethat we look either up or down, as indicated by the arrows A and B in our diagram. We shall look only through the thickness of the flat cookie, and we shall see only a moderate number of stars. But if we look toward the edge of the cookie, as indicated by the arrows C and D, we shall have much farther to go before we come to the end. That is the way we are looking when we look at the Milky Way. We have to look past thousands and thousands of stars before we come to the last one. The farther stars appear faint because of their vast distance, and seem to run together into a band of misty light, until binoculars or a telescope seperates them - "resolves" them, as the astronomers say.



You may ask, "What reason had Herschel to believe that we are nearer one edge of the cookie than the other?" Simply this: One part of the Milky Way (the part that appears in the south on a summer evening) is much brighter than the opposite part. When we look at the fainter part of the Milky Way, we are looking in the direction of the arrow C, toward the nearer edge of the cookie; but when we look at the brightest part, we are looking in the direction of the arrow D, across the center of the cookie and all the way out to the opposite side. For this reason we see many more stars. To this sysytem of stars Herschel applied the name island universe, suggesting that it has definite limits and is surrounded by empty space. It is also called the Galaxy, from the Greek word for the Milky Way.

Junior Natural History Magazine
January, 1951

OTOLITHS AND THE ICHTHYOLOGIST

How can you tell a fish's age? By counting the rings in its ears.

That may sound like a joke that you didn't quite catch, but it's true. Fish do have ears, and in their ears are pebble like "ear stones". or otoliths, that grow throughout the fish's life. Otoliths differ in size in different fish species; the average diameter they attain is about a centimeter. The stones, which help fish to hear and to orient themselves, grow in discrete layers, like the rings in the trunk of a tree, and a new band is added every day. To an ichthyologist those bands indicate not only a fish's age, but how quickly it grew, how the temperature of its environment changed from day to day, and when and how the fish changed its behavior patterns during its life.

Dr. Edward Brothers, an ichthyologist and marine biologist at Cornell University, has examined "many, many thousands" of fishes' ears over the past decade to learn how to interpret changes in otoliths' ring patterns. He and his colleagues have been able to determine which feature of the rings are affected by environmental conditions and which reflect intrinsic changes in the fish.

"Changes that affect a fish's life will be reflected in the daily rings by differences in thickness, density, and protein content," Brothers explains. "And each day's band is clearly distinguishable from the next because of the variations between day and night accretions."

The information recorded in otoliths is vital for good management of fisheries, Brothers says. "It can reflect the health and origins of a particular stock. And learning how quickly a fish grows helps scientists to determine how many of a particular species can be harvested." For example, Brothers has been studying the endangered giant bluefin tuna to learn how long the species will need to be protected while it recovers from being overfished.

Otoliths can also be used to monitor the environment. They reflect changes in water temperature caused by power stations and other industrial plants, and many even show traces of pollutants such as heavy metals.

So, peculiar as it might sound, studying the rings in fishes' ears is a valuable line of research for ichthyologists. As Edward Brothers observes, " Modern techniques for understanding otoliths provide us with a powerful new tool for the study of fish ecology."

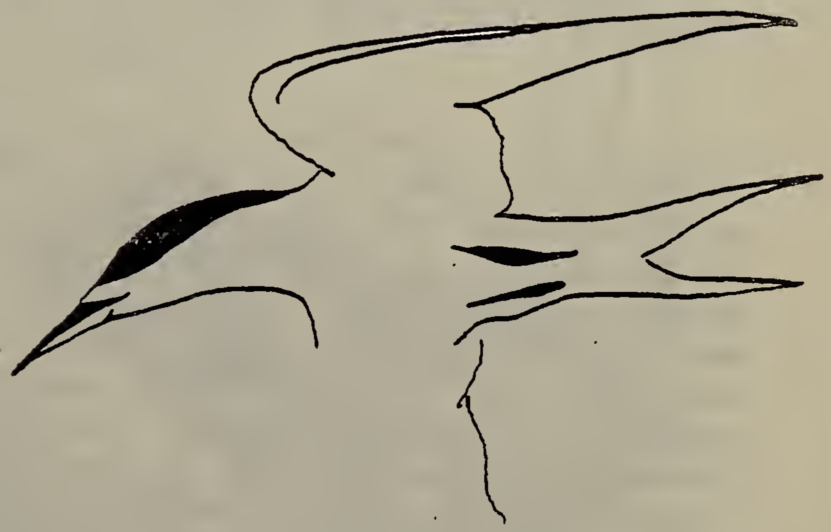
Country Journal
pp.-14-15
May, 1983

ISLAND TWITTERINGS

Oh, to be at a beach or on an uninhabited island for the summer. Well, some of us have had our dreams come true. I will share some of my dreamy beach: Plum Island. At the southern tip of the island, eight miles from the Parker River Wildlife Refuge entrance is the reservation. Here I can always hear the surf on the beach and the twitterings of the terns. The surf rolls onto Sandy Point bringing treasures of the sea. I may find a horseshoe crab or a ten foot piece of kelp, and most assuredly a downy white feather from one of the hundreds of terns on the point. The terns twitter over the ocean, ready to plunge into the water - finding a minnow or a sand eel to offer to its mate. Other members of the special colony of Least Terns are sitting on their white and brown speckled eggs, keeping them shaded from the hot sun. The small speckled eggs layed right on the sand are pretty much camouflaged among the beach grass and the weathered aluminum. Although at Night, strangely enough, the terns abandon the nesting site leaving an open feast for raccoons, skunks, and this year, an otter. In the morning the terns are back defending their eggs from nosey interpretors like myself. I of course am keeping out of their boundaries which are pointed out to the visitor by a kamakazi tern heading directly for you. The 'little strikers' have nested beyond the man made boundaries of last year This hopefully indicates the colony is growing.

My fellow interpretors, please come and visit Plum Island and see the Bar Head drumlin, the tide pools, and not to forget the last but not least colony of Least Terns.

Ellenor Simmons
Plum Island



LISTEN!

According to the dictionary, to listen is to "give ear" - an act of hearing. Ears on humans are easily recognizable, but we cannot say this of all of the creatures living in the world outdoors. For instance, do you know where to look for the ears of a katydid, or those of a bullfrog? Have you ever wondered about the way in which moths and butterflies "hear"?

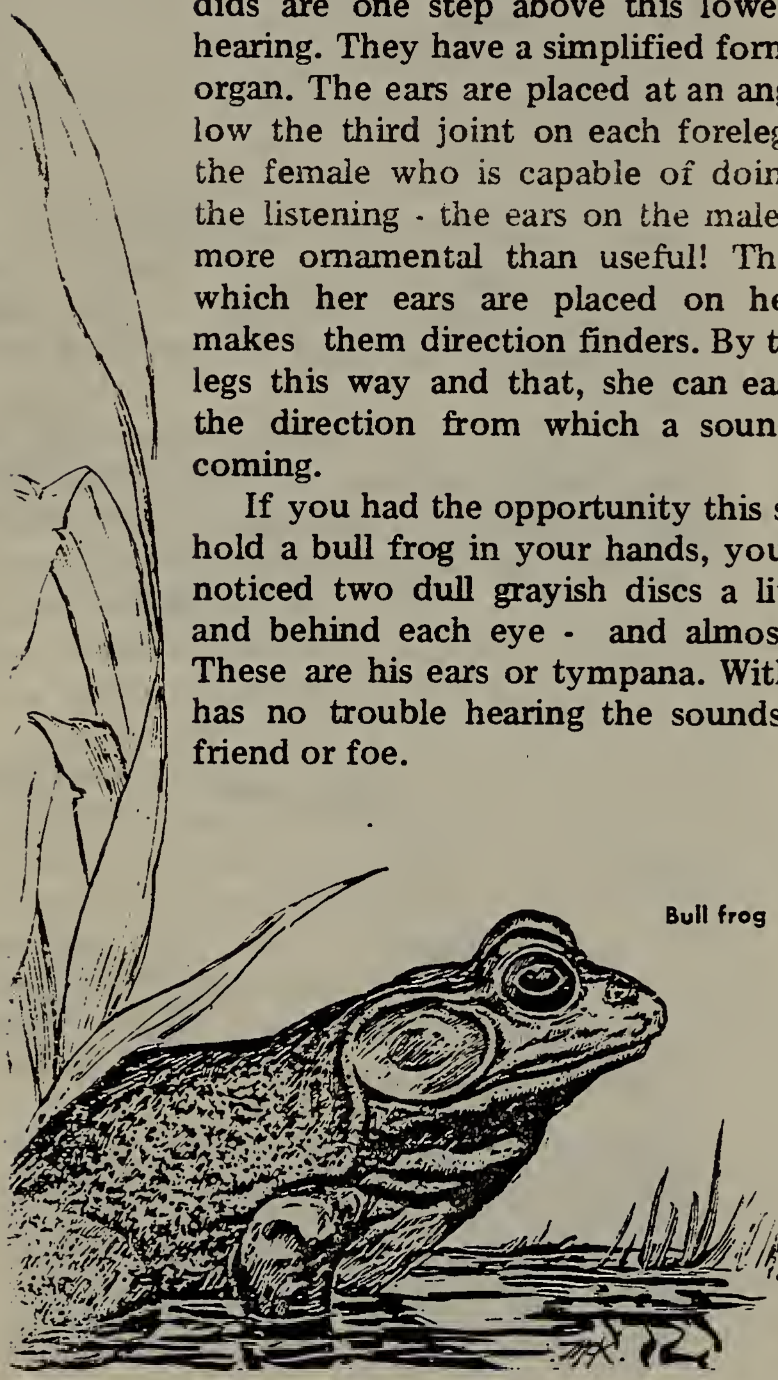
Perhaps you have seen hovering around a light at night a large, pale green moth with long, heavily feathered antennae. This is the luna moth. Nature has not provided it with an actual ear organ, but has given it a body and antennae sensitive enough to receive sound vibrations. These vibrations are "felt" by the insect primarily through the scales covering the walls of its body. Its antennae pick up the sound, too, but their main purpose is for receiving the scent given off by the female moth.

Although most insects become aware of sound vibrations through their bodies, katydids are one step above this lowest type of hearing. They have a simplified form of an ear organ. The ears are placed at an angle just below the third joint on each foreleg. But it is the female who is capable of doing most of the listening - the ears on the male are much more ornamental than useful! The angle at which her ears are placed on her forelegs makes them direction finders. By turning her legs this way and that, she can easily detect the direction from which a sound may be coming.

If you had the opportunity this summer to hold a bull frog in your hands, you no doubt noticed two dull grayish discs a little below and behind each eye - and almost as large. These are his ears or tympana. With them he has no trouble hearing the sounds made by friend or foe.

Far advanced from the listening ability the moth's is the beaver's. He has ears that not only easily recognized for what they a but are much more complicated in constru tion. Because this animal builds his home ponds and lakes, and spends a great deal his time expertly swimming or diving und water, protection against inrushing water needed. And so inside his ears there are val that close automatically whenever he g under water and open again when he com up.

Junior Natural History Magazi
October, 195



Bull frog

Katydid

PELLET PUZZLES!

Owl Pellets in Kits and in Bulk!

Pellets are masses of bones, teeth, hair and feathers. They are produced by birds which swallow their prey whole or in large pieces. Owls, hawks and eagles produce such pellets. The soft parts of the prey are digested. Body coverings and skeletons are not digested. These undigested parts are then formed into a pellet by stomach muscles and regurgitated. The pellet of a bird that had eaten two mice, three shrews, and one mole would be expected to contain six complete skeletons.

Barn owls often roost in the shelter of open barns. Their pellets accumulate beneath the roosts on the floors from which they can be collected.

Barn owl pellets provide several kinds of existing educational experiences for the student.

- The food of owls can be identified from the skeleton.
- Skeletons of mice, voles, shrews and moles can be assembled.
- Concepts of food chains, food webs and interdependence can be easily taught in connection with the dissection of pellets.

An Owl Pellet Kit includes:

- A teachers' guide containing background information, suggested teaching strategies, a laboratory guide, projects, key to skulls of mammals found in pellets, suggestions on how to collect owl pellets and references.
- One poster of the skeleton of a vole, the most common food of barn owls. Major bones are labled, and excerpted views of vertebrae, sternum and legs are presented.
- One picture poster depicting a food web in a typical barn owl community.
- Fifteen barn owl pellets, from the Pacific Northwest, fumigated and individually wrapped in aluminum foil.

OWL PELLET KIT 11 $11.00, one pound.
OWL PELLETS in bulk $8.25 for 15 pellets.
one pound.

RUSH check or money order to:
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98227
By: Creative Dimensions

HOT OFF THE PRESS

Walker's Mammals of the World,4th edtion, by Ronald M. Nowak and John L. Paradiso, 1983, is now available. This two-volume work covers more than 1,000 genera of mammals and over 4,000 different species. Copies can be purchased for $65.00 from the Johns Hopkins University Press, Baltimore, Maryland 21218

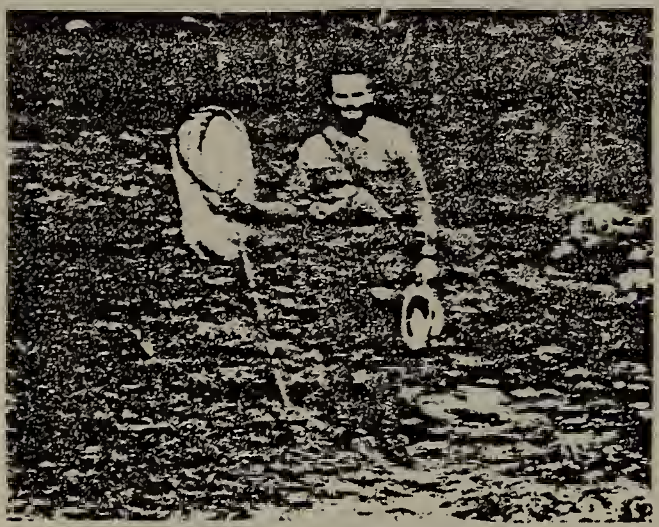
Plant Extinction: A Global Crisis by Harold Koopowitz and Hilary Kaye, 1983, is available for $16.95 ($21.95 Canada) from Stackpole Books, Cameron and Keller Streets, Harrisburg, Pennsylvania 17105.

Vanishing Fishes of North America: by R. Dana Ono, James D. Williams, and Anne Wagner, 1983, is available from the same address for $27.50 ($34.95 Canada). Both books were published by Stone Wall Press, Inc., 1241 30th Street, N.W., Washington, D.C. 20007.

The Liaison Conservation Directory for Endangered and Threatened Species-has been updated (May 1983) and published. This directory lists Federal, State-Territorial, private organization, and independent contacts who are cooperating in the U.S. Endangered Species Program. All persons listed in the directory will receive a copy. Others may purchase the directory from the Government Printing Office, Washington, D.C. 20402 (stock number 024-010-00642-1)

SUGARING FOR MOTHS

There is an old saying, "You can catch more things with sugar than you can with vinegar!" And when you use this theory in connection with moths, the result will really surprise you. Your collection of moths will grow with amazing speed; and even if you want to be a mere observer, you will find yourself involved in real adventure.



Our author—ready for action

I particularly remember one experience when I was in a lovely section of rural Ohio. It was a hot and muggy day, ideal for moth collecting if not for comfort. Deciding to shed the din and excitement of a big city, I turned my car toward open countryside. It wasn't long before the winding road reached open farm lands. In the distance, I could see a wide, green pasture rimmed by tall trees which guarded the entrance to a deep woods. This was a fine spot for sugaring. (One of the first things to be considered in sugaring for moths is the location you use for setting your trap lines. Some locations yield a greater variety of moths than others.)

This was good hunting ground. But where was the owner? And could I secure permission to go on his land? These were my immediate problems, and only after a search of the neighborhood was the proper person found and a "go ahead" obtained.

I could now set about preparing material for the evening's venture. Only five "tools" were necessary: a batch of syrup, a paint brush, flashlight, a catch net, and a capped killing-jar lined with cotton soaked with cleaning or lighter fluid.

(There are several ingredients that can be used in making a syrup for "sugaring." You can mix molasses and water, or brown sugar and jelly together. On occasion, I have added a little stale beer to my mixture. It makes the moths a bit groggy and much easier to take in the net! Whatever you use, the finished product should have the consistency of thick syrup.)

Fortified with my concoction, I set out for the line of trees at the far side of the pasture. I chose a tree and started painting my first syrup smear. I made the lick a few feet in length and width. I selected my next tree about a hundred feet from the first one and continued on in this way until I had laid out a trail of about half a mile that I could easily follow after dark. (Your experiment can become too adventurous if your trail is hard to follow in the night!) Now all I had to do was to wait for dusk.

While waiting, I wandered deeper into the woods, and as a result had to retrace my steps in order to reach the first of my smears.

Daylight was completely gone before I walked very far, and I turned on my flashlight. Suddenly, beyond the beam of my light, I saw a large, peculiar, greenish-yellow light glowing quite close to the ground. It seemed to spread out fan-wise and pulsate there in the darkness. What could it be? An animal's eyes shine at night, but they are two evenly spaced ovals - not like this mass of light!

I kept advancing until the beam of my flashlight reached it. And then a funny thing happened. The eery glow disappeared! I snapped off my light - and there it was again! For some reason, my own light had made it vanish. The only thing left to do was to go right up to it and investigate. This I did with mixed emotions - and found it to be a large group of jack-o'-lantern mushrooms growing at the base of an old tree stump!

Jack-o'-lantern mushrooms form a very decorative touch at the base of an old tree stump such as this one. Many mushrooms are topped with nicely rounded discs that do not change their general form, but jack-o'-lanterns have caps that turn up and form shallow funnels as the plant grows older.

Jack-O'-Lantern mushrooms are one of the few fungi that becomes luminous at night. In the daylight they are innocent looking growths with the impressive name of........ *Clitocybe illudens.*

Having solved the mystery of the luminous mushrooms, I quickened my steps toward my trap lines, - this time with my light out. At my first I held my net directly under the smear and suddenly turned the full force of my light on the tree. Moths were there all right! Some were so startled by the light that they flew straight up in the air while others dropped into my net. A few seemed to be resting as if pinned to the tree by the light, and still others unconcernedly continued feeding on the syrup.

Can you find the moth? This specimen is known by the impressive name of *Gluphesia severa*. It does not have a "common" name. This one very obligingly came to one of my sugar licks.

The next step was to make a selection from the specimens that dropped into my net, and get them into the killing-jars. I then put the mouth of one of the jars over the moth I wanted from the net, and as soon as it was inside, I screwed on the cap. Carrying out the same routine, I visited all the trees I had painted along my trail.

Before I completed my night's venture, I realized that other creatures besides the moths I wanted were entering the scene. I could hear the insistent "zip-zip" chirupping of the cone-headed grasshoppers in the nearby swamp grass. Bats were cruising overhead in quest of insects and, and at one spot, an owl swooped down and snapped up insects that had come to one of the sugar licks.

All these sounds and movements in the dark kept the job of collecting from being monontonous! I started back to the city with the satisfied feeling that I had some excellent new specimens of moths as well as an adventurous evening.

John C. Pallister
Junior Natural History Magazine
September 1950

GET'EM WHILE THEY'RE HOT!

Send only $5.00 plus $1.00 for shipping to Interpretive Services by September 2,1983 for your very own, deluxe "Park Interpretor" T-shirt, that will have this emblem on it .....

Interpretive Services

Park Interpretor

Please remember to include size, color (almost any available) and where to send it.
Also available, "Interpreting For Park Visitors" by William J. Lewis. If you want the book, send $2.00 to Interpretive Services by September 2, 1983, and where to send it.

INTERNSHIP IN ENVIRONMENTAL MANAGEMENT

Sponsored by:
Delaware Nature Education Society (DNES)
Ashland Nature Center
P.O. Box 700
Hockessin, Delaware
in conjunction with:
University of Delaware
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5 week program of environmental administration. January-February, cost $500.
Scholarships available.
Organizer: Lorraine Fleming.

JOB?

NATIONAL RECREATION AND PARK ASSOCIATION

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Alexandria, Va.
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703/820-4940
Park and recreation personnel position vacancies are listed through the "National Job Bulletin Services"

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(Residential Environmental Education)

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Position openings with D.E.M.
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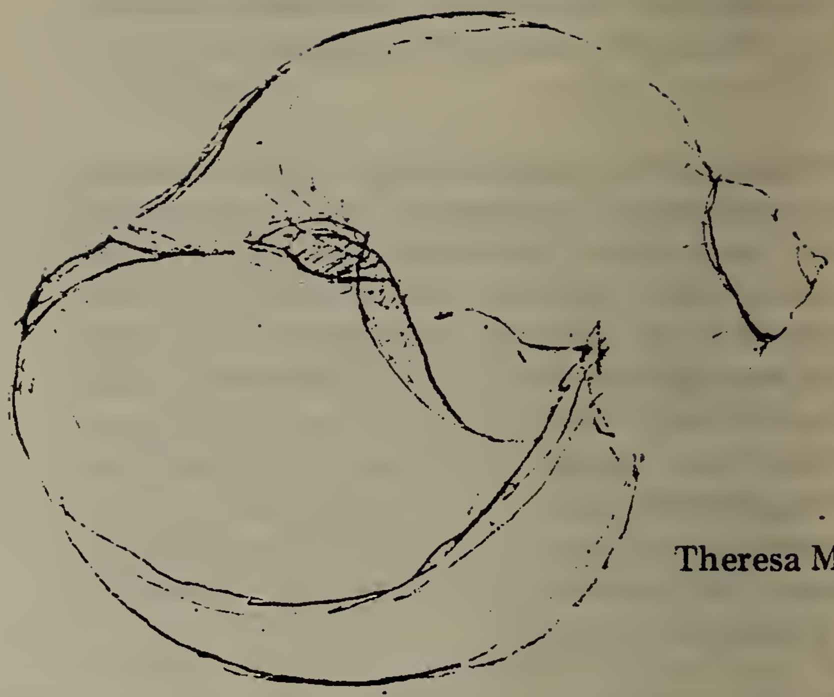
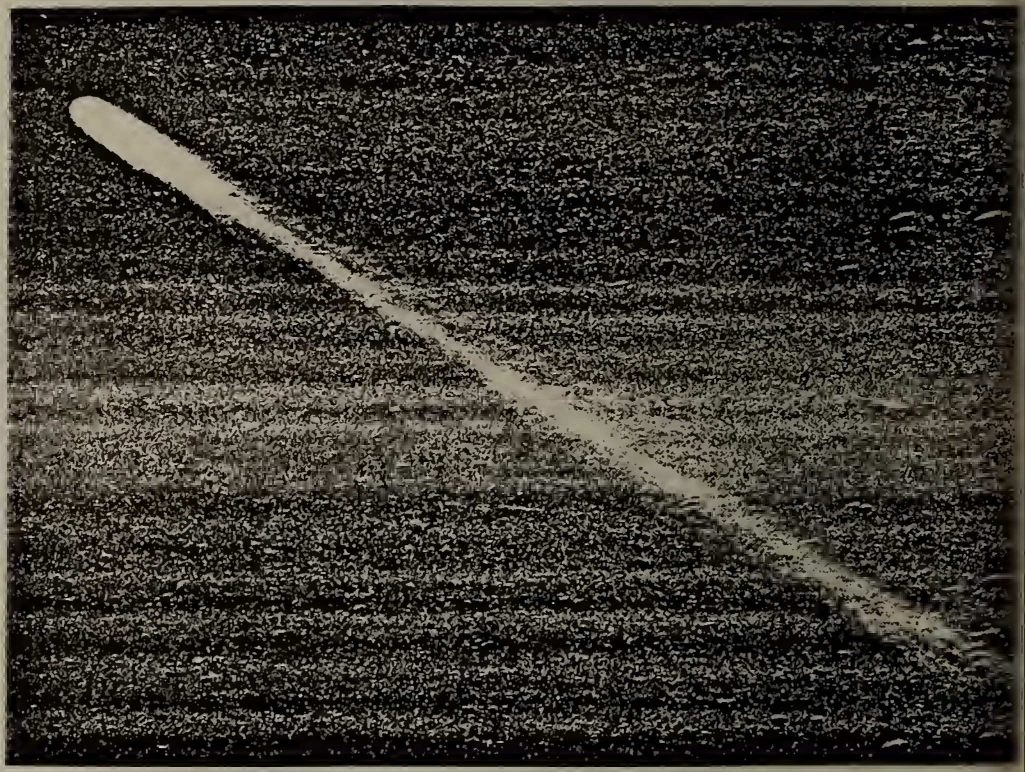
Position includes interpretation, recreation programming, environmental education, and public information in an urban heritage park.

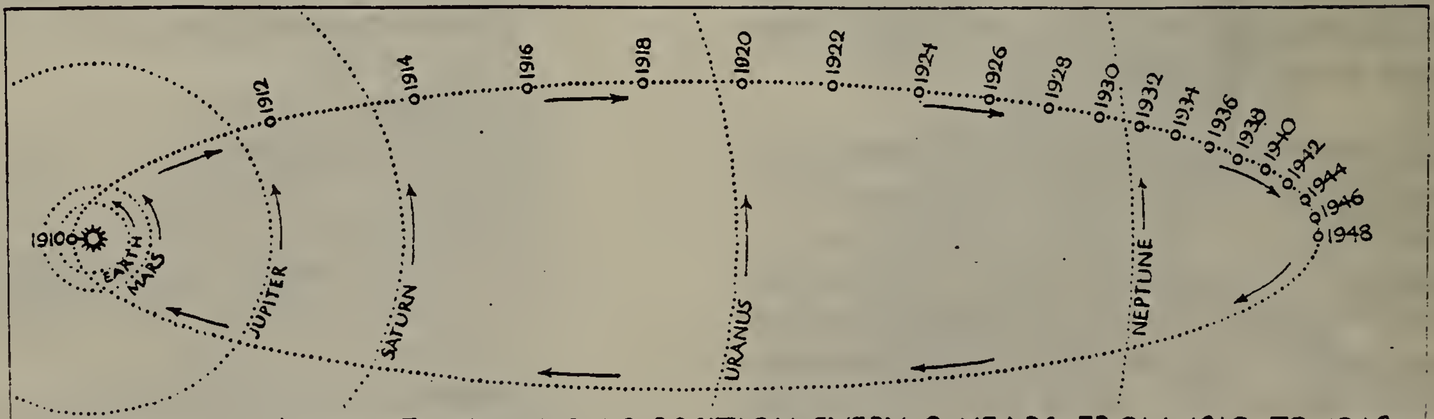
If you're interested send a resume to:
Robert Freedman
Bureau of Urban Services
D.E.M.
13th floor, 100 Cambridge St.
Boston, Ma.
02202
*you will be contacted when interviewing starts.



Theresa May



Halley's Come



ORBIT OF HALLEY'S COMET- SHOWING ITS POSITION EVERY 2 YEARS FROM 1910 TO 1948

Blue Flag
Massasoit State Park
·Theresa May·

SURVIVAL IN SAVOY

You never expected your backpacking trip to be like this. One week of paid vacation and now look where you are! You had heard about these things happening, but it never occured to you that they might happen to you and your friends this weekend. If you're lucky, someone will have a pocket knife onhim or herself. Rarely do we realize the versatility of such a tool until a situation like this arises. If you're not so fortunate, you'll simply have to improvise.

You're stranded in the woods for three days and nights. All your supplies were lost in a raging river. One memeber in your group suffers from a broken bone. Your trip was going so smoothly until this mornings accident. Now what do you do?

The name of the game is wilderness survival, and it happens this summer at Savoy Mt. State Forest. Following a survival tale which sets the tone, groups of four to six people find themselves confronted with a task. They must muster up all their ingenuity and resourcefulness to meet their challenge.

Each group devises a three day survival plan, which considers basic needs like protection, warmth, food, and water. After priorities are set, the plan goes into action as people test their shelter designs, fire building abilities, newly invented water containers, animal traps, etc. Usually an hour passes before everyone sits back and the success of the survival plan is determined by a group vote. Most groups admit some discomfort but insist they will survive.

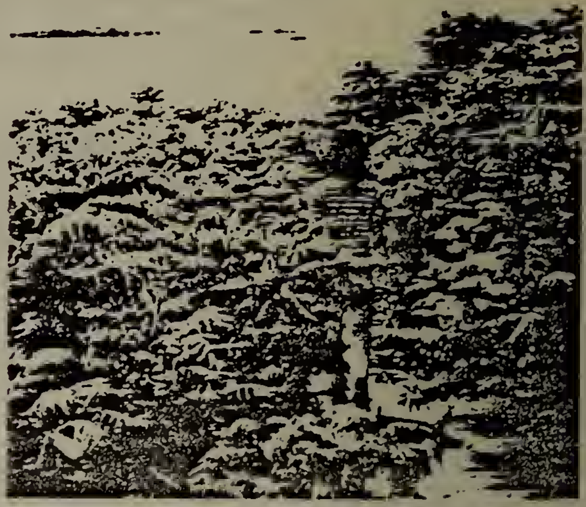
Finally, when the groups compare survival plans and survival camps there is always an element of surprise. No two shelters have looked alike. Yet every group seems to agree, hands down, the best toilet paper substitute is the leaf from the striped maple. This however (in the interpretor's eyes) is not the most important lesson learned. While several themes and lessons are undoubtedly incorporated into wilderness survival, the greatest has to do with people working together. It's people, using their heads, making decisions, putting forth individual efforts for the benefit of the whole. And in the end it's called survival, as if your life depended on it.

Betsy Kiernan
Savoy Mt. State Forest

WELLS STATE PARK

If you are looking for information on the history of New England, try using the research library at Old Sturbridge Village, Sturbridge, MA. The village also has available curriculum packets for schools on sale at their gift shop which has material about early settlers, including original letters and descriptions of life in the early 1800's. Contact the Museum Education Center for a catalogue. I also use postcards from the village showing farm labor, spinning, cooking, etc., in a walk about park history.

Sarah Blodgett
Wells State Park



GROWTH AND DEVELOPMENT IN THE BOSTON HARBOR ISLANDS

History was made July 26, 1983 as the first photovotaic unit was installed on Grape Island. The team of technicians led by Park Supervisor Brian Shanahan and Solenergy Corporation of Woburn MA., broke dirt early Tuesday morning and assembled the recharger unit and storage box. The solar system willbe utilized as an aid to improve communications and provide lighting for Island Managers during their extended visits.

The solar module located at the top of a mast, converts light directly into electricity. This module puts an electrical charge into a special battery which stores the electricity for use when needed. The battery in this system has been wired to a rack to recharge a portable radio and to an outlet for powering a fluorescent light. This system requires little maintenance and is free of noise and pollution. It is a 12 volt DC system similar to that used in motor vehicles. The mast (solar panel) has been equipped with a lightning rod for storm protection and the modules have bird spikes to discourage roosting.

Melissa Burdett
Grape Island

PUBLICATION: #13331-12-100-8-83-CR
Approved by Daniel Carter, State Purchasing Agent

MASS. EA10.3: 983/9

GOVERNMENT DOCUMENTS
COLLECTION
JAN 6 - 1984
University of Massachusetts
Depository Copy

Bay State Interpret Ear

September 1983

bulletin

Dear Interpretors,

As the summer season closes we look back with wistful remembrances to June, July and August. I.T.I. training in Connecticut feels as if it had ended only a week ago, yet a lot of interpretation has gone under the bridge. We'd like to thank you all for making this an exceptional summer, and wish you the best of luck for the future.

Viva la interpretation!

Andrea Joshua Heidi

Publication Number 13360-12-150-9-83-CR
Approved by Daniel Carter, State Purchasing Agent

Office of Interpretive Services
Division of Forests and Parks
Massachusetts Department of Environmental Management
100 Cambridge Street, Boston, Massachusetts 02202

HOW DO YOU KNOW YOU'RE A GOOD INTERPRETOR?

This question has been asked of a good many interpretors. The responses to this question have been insightful and varied. Enough responses have been gathered by now to see a pattern emerge. I might categorize the responses in four groups as follows with some examples and a comment or two about each.

1) Intuitive. "I get good 'vibes' from the group". "They're enthusiastic." "I feel good about my talk when it's over." "You can tell when you're doing a good job or a poor job." "I've done it enough times to know for myself." "I feel it." "Down deep inside I have a gut reaction."

Comment. Intuitive feelings are valuable indicators of interpretor success. They are the basis of self-analysis. The problem is, it's difficult to repeat. How do you deliberately recreate conditions in which "good vibes" recur consistently?

2) Knowledge. "I know I'm a good interpretor because I know my subject well. I study, keep up to date on new information about my environment." "People ask me the darndest questions and I always feel good when I can provide the the facts they request."

Comment. To be sure, possessing knowledge is a crucial ingredient for a good interpretor. Providing data to questions asked by visitors probably occupies most of the interpretor's tour time. Knowledge alone, however, is not enough. Facts, like fish, soon grow stale and are soon to be discarded. Knowing when, how, and in what sequence to deliver information seems to make it more relevant to the visitor.

3) Commitment. "Can I try it?" comes a request from a group member. When visitors voluntarily request manipulation of materials or self-experimentation it indicates high emotional involvement. "Do it again" pleads another visitor. When a person requests repitition of an activity or when he returns for a second tour it is an indication of his commitment.

Comment. Voluntary behavior is a form of a visitor's high emotional involvement. It is an indicator of his preference, enjoyment, and values.

4) Cognitive Involvement. Actively and voluntarily participating in discussion activities or question and answer periods indicates cognitive and emotional involvement. This is when the visitor enters a "rap" session recalling previous knowledge, comparing the present with other environments, suggesting solutions to problems, applying concepts gained, offering examples, making inferences and generalizations and drawing conclusions for him/herself.

Comment. Being able to create this behavior in an audience is probably the highest form of the interpretor's skill. It causes the visitor to become both intellectually and emotionally involved in understanding, analyzing, and using information from the environment.

In Summary. If these are truly the characteristics of a good interpretor, then I'd say you aren't interpreting at all; Rather you are helping the visitor interpret his environment for him/herself: Perhaps you ought to change your title from interpretor to something like, "Facilitator of interpretation"!

Arthur L. Costa
In Touch
January, 1975

AND THEN CAME DOC

"Well, she was found with a broken leg when she was about 2 weeks old and the folks at Berkshire Veterinary Hospital took her in. Now at 2 months of age, she needs a place where she can stay outdoors yet be looked after until she can fly and fend for herself." (And if I had a dollar for every time I've exlained that...!) So goes the story of Doc, our crow in residence. She's been here merely 2 weeks, yet has drawn more crowds than I have all summer, I think.

Being mother to a half-feathered, squawking crow is a new experience for me, but it didn't take long for me to be won over. And like any mother, I'm proud to talk of the "kid's" accomplishments -- her flight feathers are growing in quite nicely, she found and ate 2 flies and a green worm all by herself the other day (we feed her dog food) and she flew (!) nearly 20 feet today.

Doc loves an audience and will often wander around to the front of the lodge, where the action is, looking for food, attention and shoelaces. That last one sure gives the little folks a scare at first, then a thrill that a bird actually came over to them!

With Doc drawing the audience with their gamut of questions, I can then explain all kinds of things about birds such as feeding, molt, behavior and, most importantly, that this crow is not a pet and hopefully will make it on her own in the big outdoors. Now, if I can just get these white stains off my shirt....

Kathy Calabrese
Mount Greylock

SCROUNGING FOR INTERPRETATION

Like a caterpillar creating a pupa to rebirth as a butterfly, our comfort station has gone through many stages to become an interpretive center.

Our first actions were to scrounge. What is there that we can use? Ah ha! Paint. Look – "Boulder Tan" – a wonderful color, but only one can. Low and behold, six cans of "Cedar Green", kind of a cauliflower green. Next, scrounge a paint scraper, and a paint brush. Being the scrounger that I am, I recalled the mention of paint brushes in the office filing cabinet. Of course, everyone keeps paint brushes in the filing cabinet. So much for the painting drama.

During this slow facelift of the center, Terri Talas, an interpretive artist, is working on three murals for the center: marsh, dune, and ocean. She has completed some small drawings to put on the light/question board. The board has batteries, wire, and lights, which we scrounge. In another corner we have a "feely" board. A visitor puts his hand through the cut out holes and touches a shell or a starfish. Bill (my fellow interpretor) has built an exhibit shelf from a vandalized picnic table, and constructed a tern nest display (with narrative), in addition to other work.

Our pride and joy is our bathtub, a retired trough donated by Tim and Tag, the local state police patrol horses. Our tidal tub is ready to go, although we are having trouble preventing leaks. In it we have mussels, starfish, and a few periwinkles. With all this imaginative energy we finally opened August first.

Ellenor Simmons
Salisbury Beach/
Plum Island

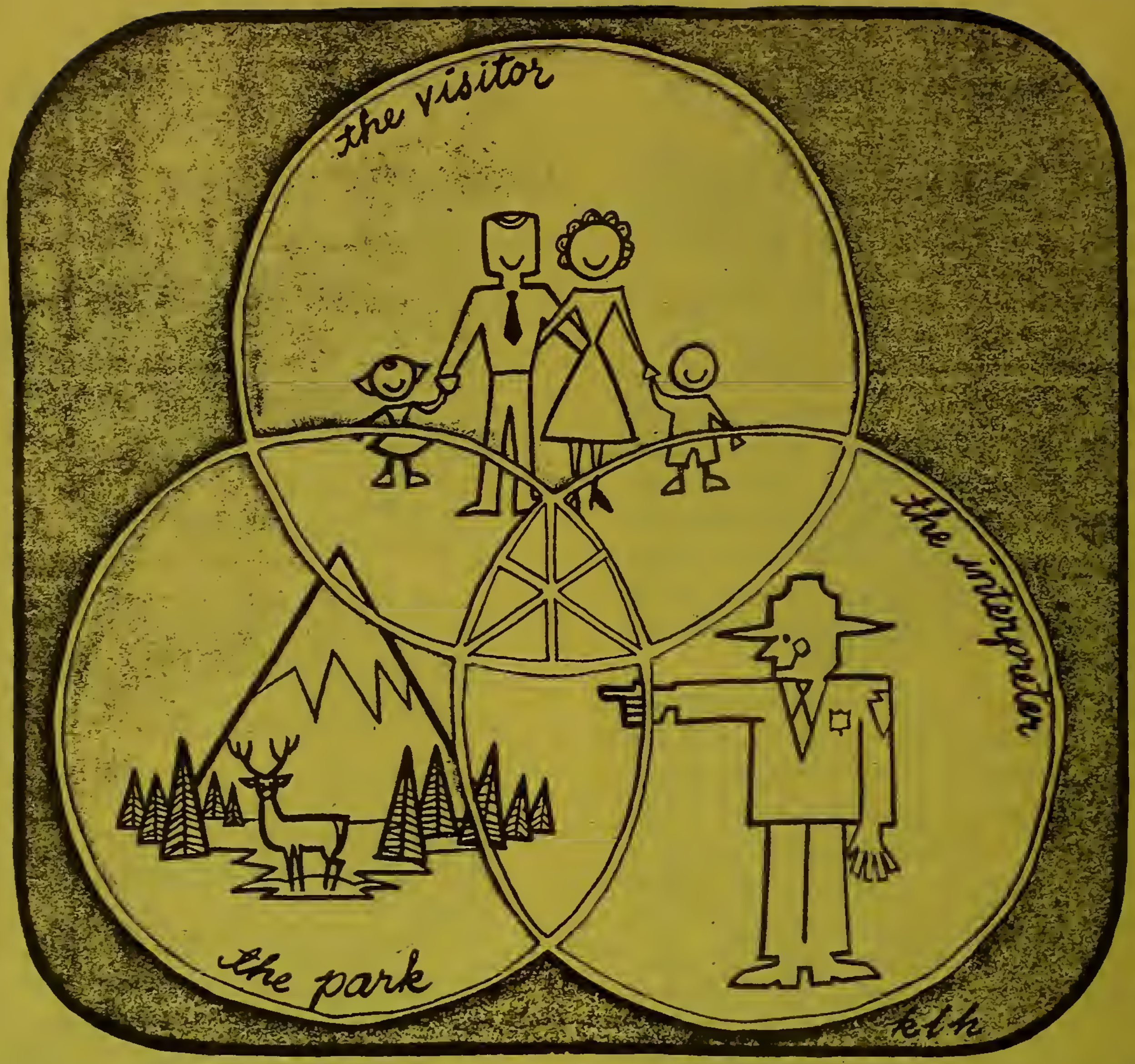
C.C.C.'s AT GREYLOCK

How would you like to be snowed in for five weeks, no mail from home, food running low? That's what happened to the 107th Com pany of the C.C.C.'s stationed two miles down from the summit of our highest Massachesetts peak, Mt. Greylock. That was 50 years ago. The second week of August we featured this sort of story on Mt. Greylock Reservation.

We introduced the public to the C.C.C.'s with an exhibit at the Visitor's Center, then led an auto caravan, stopping at structures such as fire ponds and culverts built by the C.C.C.'s. We proceeded to the site of their encampment, where we discovered steps leading to nowhere, foundations without buildings, a pipe leading to an old gasolinr storage tank, and other evidence that buildings once existed at the site. On the summit, we treated visitors to a chicken barbeque and featured four former C.C.C. enrolees in an evening recalling those "good old days".

A great deal of research and exploration took place in the preparation for the big I found the auto caravan and barbeque program quite rewarding. The participation by camp groups at the site of the former C.C.C. was less successful; weather didn't cooperate on the dates I planned to have campers compete in finding "ruins". Possibly we will yet have a chance to run a modern archaeology search.

Betty Phinney
Mt. Greylock



MAKING PERMANENT AN INTERPRETOR'S IMPACT

Imagine a fictitious Massachusetts State Park named Ois Mountain State Reservation. Ois Mountain has a bucoloic setting with panoramic transparent views of the surrounding countryside. A highly energetic seasonal interpretor is conducting a successful program. As each week passes he realizes that a particular item or piece of equipment would greatly enhance his program. To acquire these items he borrowed from others, used his own property and in some cases went ahead and bought things he needed rather than go through the system to justify what he needed and therefore get reimbursed.

Among the goodies the Mt. Ois interpretor used was a pressed leaf exhibit under plexiglass, a slide projector from a trusting friend and a half dozen dial a star constellation finders. Unfortunately when our dedicated interpretor packs up his jalopy and rumbles off to points unknown so went his personal equipment. So also went tangible fixtures of an interpretive program. The acquisition of materials, equipment and props for an interpretive program at a park is important in making permanent the program's establishment. I'm not suggesting or even hinting that "things" are needed to provide an effective interpretive experience for the visitor. The best interpretive experiences are the result of some unique spontaneous creative effort, not paraphernalia. However from a management point of view there could be a different story.

Unfortunately park managers are forced to deal with and respond to tangible features of their parks. Does the road shoulder need to be mowed? Do the comfort stations need to be painted? Does the campground office need to be reorganized? These are the concrete needs of the park. The improvement of these conditions have tangible results. A positive visitor experience is intangible and therefore difficult for managers to relate to and appreciate. Therefore to keep the impact of an interpretive program alive there is value to having tangible reminders of the program around. Let the manager trip over some supplies and props in the middle of the winter. At least this will remind him of the upcoming interpretive program.

Be creative in using the supplies that O.I.S. provides to make permanent contributions to the park. In a peculiar kind of way the accumulation of paraphernalia will soon officialize the program in the eyes of staff, even though it might have an unpredictable impact towards the visitors' interpretive experience.

Bill Lesser
Salisbury Beach/
Plum Island

OBSERVING FROM A BLIND

Wildlife on this continent is often wary of human observers. For wildlife observations, try building a portable blind that you can move easily from one place to another. Here are some hints for building and using a portable blind.

Get a large packing carton that you can stand in or at least sit inside. Ask for one at an appliance store or furniture moving company. Cut out one side and cover the top and all sides with snugly fitting, drab covered burlap, or better, canvas. Simply draping the material is not good because any flapping material would keep animals away. Fasten the material to the carton with fabric glue or heavy duty tape. Or sew it in place. Overlap edges to keep rain and dampness away from the cardboard. Cut small peep-holes on the front and sides.

Stake the blind in a suitable place and stay away from it for a few days. Then quietly slip inside. Bring something to sit on, a journal and a quiet snack. Don't leave anything outside that may tip off your prescence inside. Be prepared to wait -- it will be worth it.

Curious Naturalist
November, 1975

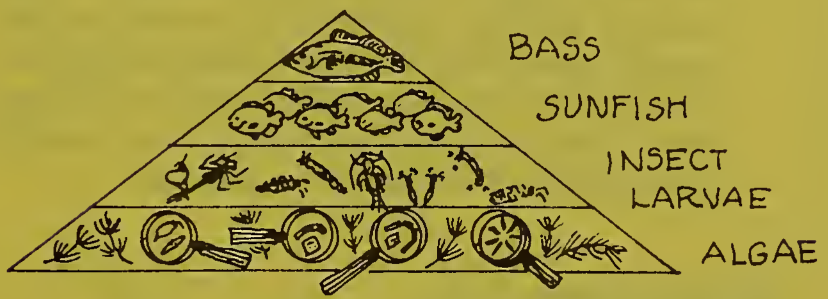
SOME BIOLOGICAL ENERGY ARITHMETIC

Scientists have been studying the effeciency with which energy is transferred between living things. The chart below shows some averages of how many energy units of the food species are needed to produce one equivalent energy unit for the consumer. For example, in the first case on the chart, the tiny daphnid would have to eat algae that had stored eight calories in order to gain one calorie of energy for its own use.

Algae to daphnid	8 to 1
Algae to insect larvae	9 to 1
Algae to minnow	7 to 1
Algae to catfish	9 to 1
Daphnid to minnow	6 to 1
Insect larvae to sunfish	11 to 1
Minnow to bass	8 to 1
Sunfish to bass	7 to 1

According to the figures on the chart, how many energy units of algae are needed to produce one energy unit of fish in each of the following food chains?

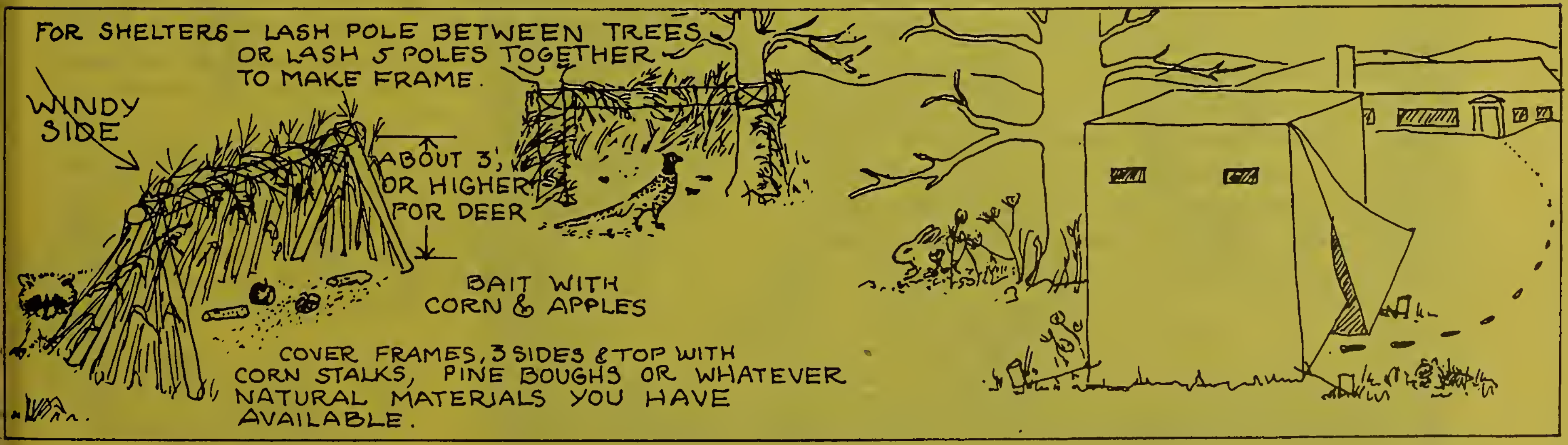
1. Algae to catfish.*
2. Algae to insect larvae to sunfish.
3. Algae to daphnid to minnow to bass.
4. Algae to insect larvae to sunfish to bass.



Can you see that as each food chain grows longer its overall effeciency decreases? A food chain with only two links, such as a cow eating grass, is much more effecient than one with four links such as number four on our calculations above.

Curious Naturalist
September, 1974

*9,99,384,693


FOR SHELTERS – LASH POLE BETWEEN TREES OR LASH 5 POLES TOGETHER TO MAKE FRAME.
WINDY SIDE
ABOUT 3', OR HIGHER FOR DEER
BAIT WITH CORN & APPLES
COVER FRAMES, 3 SIDES & TOP WITH CORN STALKS, PINE BOUGHS OR WHATEVER NATURAL MATERIALS YOU HAVE AVAILABLE.

BATS

Bats are gentle, intelligent, usually beneficial animals, and not the aggrssive flying monsters depicted in fable. They are meticulously clean and rarely transmit disease or parasites to humans. Indeed, since 1946, only ten people in the United States have died from rabies contracted from bats – far fewer than the number of people killed from dog attacks.

According to *Bat Conservation International* (a Milwaukee based organization devoted to bat research), some studies of wildlife populations have shown that the incidence of rabies in wild animals is actually lower where bat populations are high.

Although bats constitute one fourth of the world's mammal species, their numbers are declining everywhere, largely, it is thought, because of human disturbance during hibernation, when a single person entering a cave can disturb thousands of bats, causing depletion of their limited energy reserves. Another factor, of course, is that despite their obvious value, they are relentlessly persecuted. Unlike Europe and the Soviet Union, where bats are legally protected, the U.S. offers formal protection only to those few species whose numbers have dwindled suffeciently to qualify them for the Endangered Species list.

The Ternate Bat

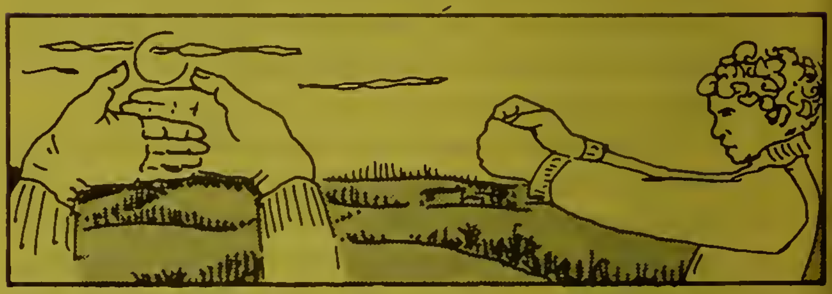
In reality all bats native to the U.S. are highly beneficial to people. They provide an insect control service that is staggering when one considers specific numbers. A single gray bat, for example, has been estimated to consume some 3,000 insects in a single night. This means that some larger bat colonies may destroy a ton of insects each night.

Adapted from;
The Register
August, 1983

USING THE SUN AND A WATCH INSTEAD OF A COMPASS

We all know that the sun appears to cross the southern sky each day. If you want an accurate way to find true south at any time of the day, without a compass, you can use a wrist watch. Point the hour hand of a correctly set watch at the sun. In the northern hemisphere, south will always be halfway between the hour hand and number 12 on the face of the watch. Of course, once you know south you can find north, east and west.

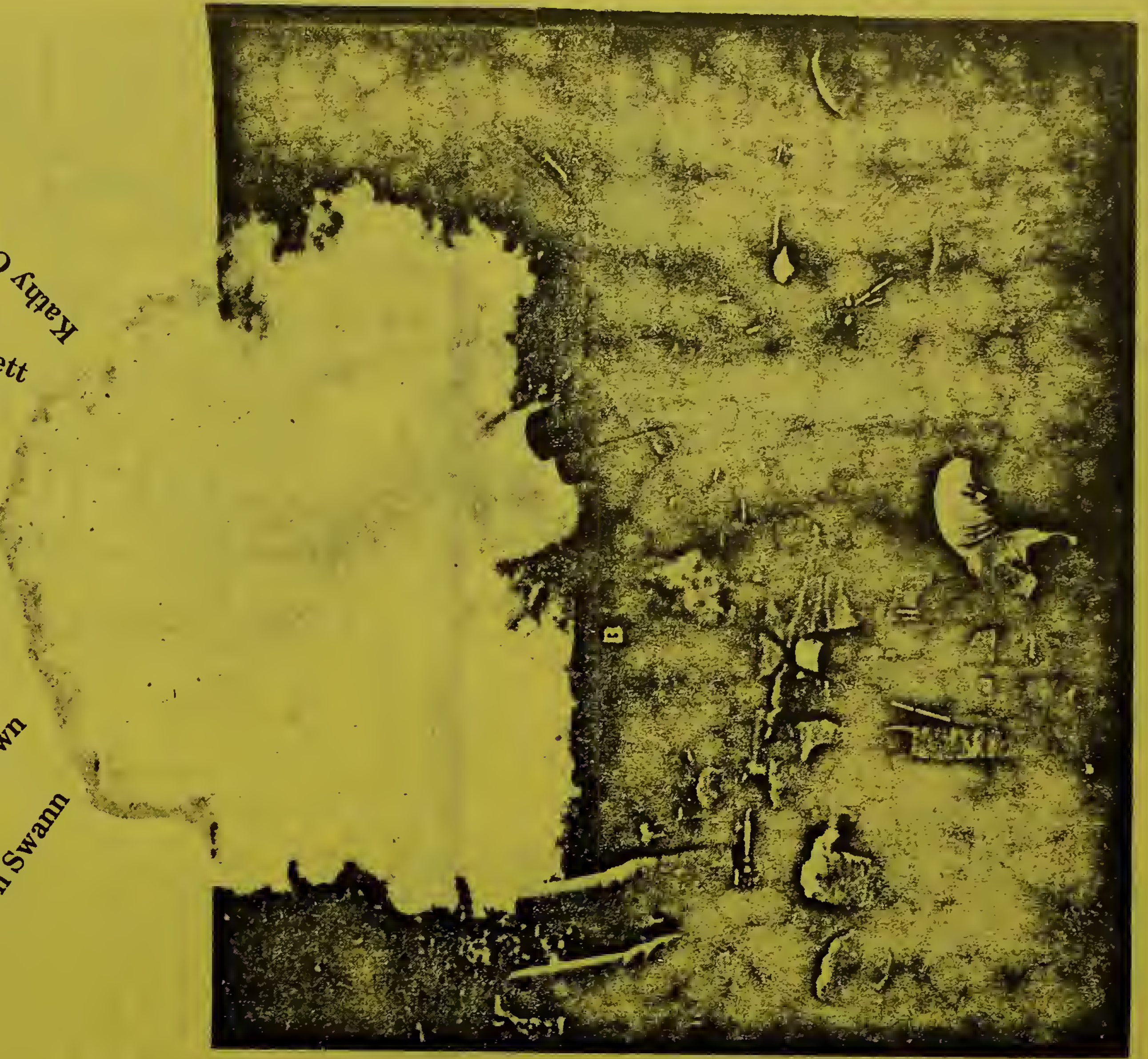
USING YOUR FINGERS TO ESTIMATE THE TIME TO SUNSET



If you have no watch but are concerned about how many hours of daylight are left, here is a helpful tip. Face the setting sun with both arms straight out in front of you. With your fingers estimate the distance between base of the sun and the horizon. That is, each finger equals about fifteen minutes. Four fingers means one hour until sunset. Four fingers on one hand and two on the other means one and a half hours to sunset, and so on. If the sun is more than youe eight fingers above the horizon, you can still figure the time to sunset by using a stick at arm's length. Hold the stick vertically so that its base comes to the horizon. Mark the place on the stick with your fingernail where you see the base of the sun. Then measure how many fingers fill the space on the stick.

Curious Naturalist
January, 1975

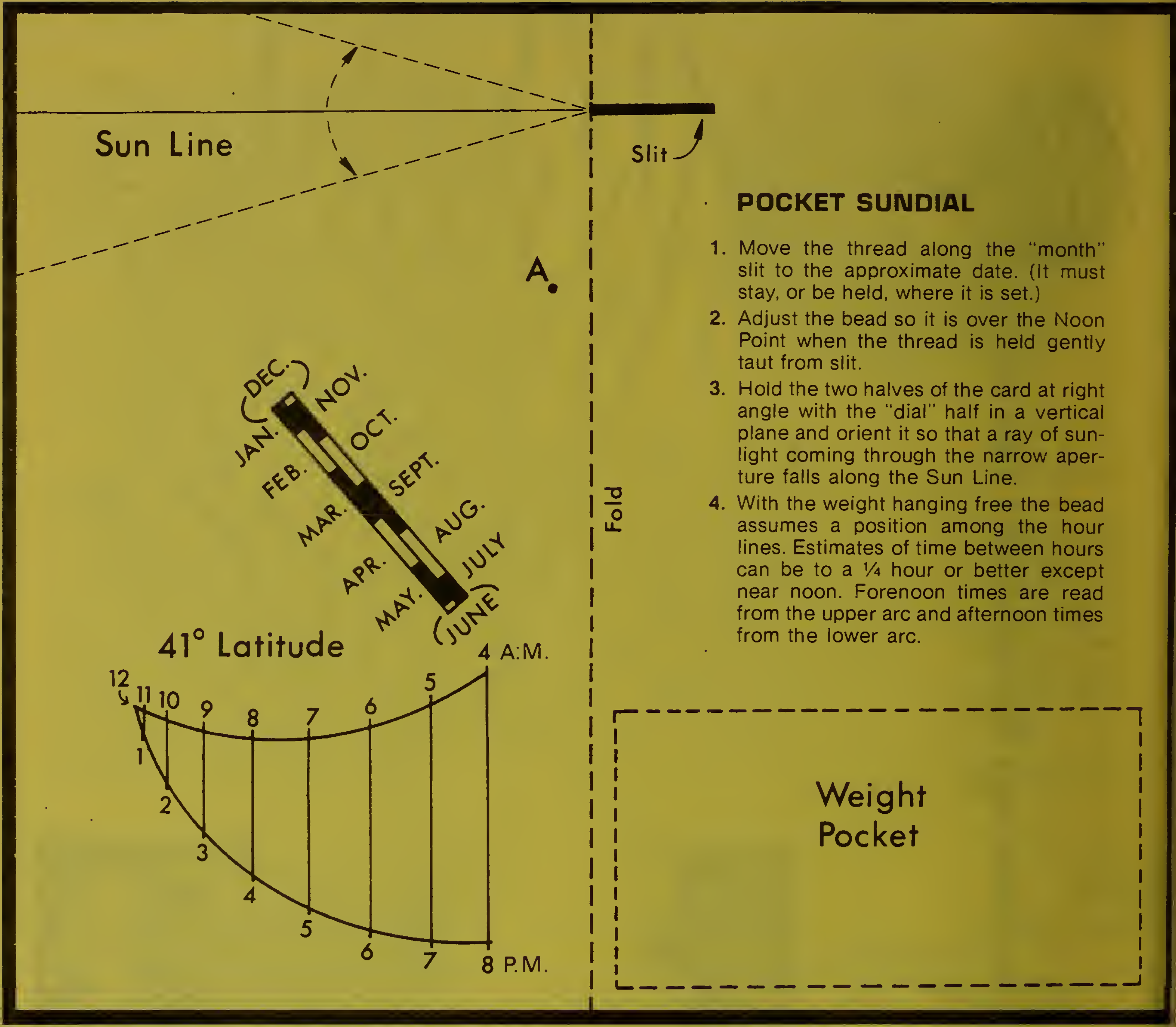
Don Abodeely Dave Rich Kathy Schofield
Joanne McGlynn
Anne Marie Hine Raimundo Delgado Bill Lesser Brooke James Kathy Calabrese
Mark Sivazlian
Theresa May Cathy Begej
Ellenor Simmons Dawna Blair John Hufstader Sarah Blodgett
Eric Pratson
Terry Leahy Doug Fishman Mary Judd
Richard Scott
Jeanne Freeman Steve Antil Andrea MacKenzie
Ann Scott Wende Wahl David Babel
Brad LaRoche Tom Wickham Jim Tantillo Linda Versage Alan Fried
Dick Doucette Mat McKeon
Joan Newkirk Catherine Lindell Therese Lawless
Melissa Burdett
Jennifer Beaven Chuck Korn Betsy Kiernan
Gretchen Adams
Wendell Cerne Lisa Hayes Betty Phinney
Margaret Blanding
Laureen Berube Liz Dann Michael Jacobson Maggi Brown
Neil Abelsma Kim McCormick Terri Talas Kim Noyes Don Swann
Amy Day Jerry Flaherty



Department of Environmental Management Massachusetts 1898

Thanks for making the summer a BLAST!

Interpretive Services



POCKET SUNDIAL

1. Move the thread along the "month" slit to the approximate date. (It must stay, or be held, where it is set.)
2. Adjust the bead so it is over the Noon Point when the thread is held gently taut from slit.
3. Hold the two halves of the card at right angle with the "dial" half in a vertical plane and orient it so that a ray of sunlight coming through the narrow aperture falls along the Sun Line.
4. With the weight hanging free the bead assumes a position among the hour lines. Estimates of time between hours can be to a ¼ hour or better except near noon. Forenoon times are read from the upper arc and afternoon times from the lower arc.

A POCKET SUNDIAL

This simple sundial idea came from a type of sundial used in the seventeenth century. Although it is not an accurate timepiece, it will tell the time to within about 15 minutes, and it's fun to make and to use. Directions:

1. Cut out the rectangle (or a photocopy of it) along the colored line. Glue it onto medium thickness cardboard.
2. Cut out narrow black rectangle at end of sun line marked "slit". (Cut completely through card.)
3. Make a (razor) slit along the center line of month scale just equal to its length.
4. Score the cardboard along the fold line with a **dull** knife and fold printed faces together.
5. Paste or tape a piece of paper over the words "weight pocket"; put paste only along its edges and bottom.
6. Pierce card at "A" and pull through a 9″ long thread with a knot at one end so that knot fetches up against inside face. Bring free end back through card at month slit. Reeve a small bead onto the thread, looping thread once around, and then tie a penny-size washer (or other FLAT weight) at its free end. The "weight pocket" will hold the washer when sundial is not in use.

The dotted lines above and below the Sun Line indicate how you can adjust the sundial for your latitude: if your location is north of 41°, draw your Sun Line above the one shown, adding to the angle indicated above this Sun Line as many degrees as you are above 41°. Draw your Sun Line below the one shown, if your location is south of 41°.

from: Ward's *Bulletin*, Jan. 1971.
published by Ward's Natural Science Est., Inc.

PINEAPPLE WEED FOR THE MASSES

Ah, the sweet smell of *Matricaria matricariodes*, the pineapple weed.The year's first tiny plants were sighted in mid-July here on Mt. Greylock's summit on a well worn pathway. Since that time, this fragrant but often unnoticed plant has blossomed in wild profusion: along rocky paths and roadways, in the staff parking area and as a major constituent of the not-quite-lush lawn outside Bascom Lodge's kitchen door.

This plain little weed, which never gets much above 6" high due to the poor quality of soil in which it finds its niche, has been quite a hit with our many visitors. That is, of course, once I've pointed it out to them. Most would never notice the plant underfoot otherwise! My summit tours just wouldn't be the same, I think, without the "sniff-test": "See this little plant at your feet? Here, let me pick one of the flowers for you. Crush it a bit and smell .What does it remind you of?" The answers are varied, with most participants guessing along the fruit line -- "Strawberries...... Oranges.... even Pineapple." Others guess "Pine." And then there was the guy who smelled "Salt and pepper."

Knowing that pineapple weed is a sister of chamomile (and is often mistaken for it), I wondered how it would do as a tea. My two source books for plant uses said nothing of this one. A jaunt to the local library proved helpful, where I found a copy of *Wild Edible Plants of New England*, by Joan Richardson, which informed me that pineapple does indeed make a wonderful tea. With that encouragment, I picked a handful of the yellow-green cone-shaped flowers, poured boiling water over them and, voila!.... it was tea time. An interested crowd gathered, drawn by the aroma. Thus began one of those "interpretive moments" that we love and live for.... I sure have found that little "weed" to be quite a helpful companion this summer!

Kathy Calabrese
Mount Greylock

INTERPRETING FOOD

Did someone say interpretation is blueberry picking? At Mt. Greylock, the phrase was taken to heart, as 1983 delievered one of the finest crops in recent years. To celebrate the abundant harvest, a "Berry Bonanza" was held on Sunday, August 7th. The program began at 8:30 am with a public invitation to join interpretors on a blueberry gathering at Jones Nose, the Reservation's popular blueberry haven. The Bascom Lodge "Berry Brunch" that followed was a huge success! Reservations were required to feast on blueberry crepes, cheese blintzes with blueberry topping,blueberry pancakes, fresh fruit salad, and more. By request, a repeat performance is being set for August 21st. Food is a most effective interpretive tool!

Kim McCormick
Mt. Greylock

(The cover picture, and picture accompanying Bill Lesser's article are reproduced from the National Park Service newsletter *In Touch*, September 1977 and January 1975, respectively.)

AN INTERPRETOR'S WORK IS NEVER DONE

As a child of the environmental movement I was brought up on the concept of interdisciplinarity. An interesting concept, but one that I rarely saw in action until I began working and talking to interpretors. The range of disciplines that you are involved with (knowingly or not) is truly amazing. I thought it might be enlightening to list and comment upon some of them.

Environmental Psychology. This relatively new realm of psychology has as one of its tenets: Behavior is influenced by the content of the environment an individual is in. A gross example is that people don't wear business suits on the Appalachian Trail. How does an interpretor work in this discipline? You become aware of the behaviors of campers and day users and design your programs appropriately. In a very real sense you know what the visitors are doing at the park better than they do themselves.

If you're interested in this discipline there's lots to read. Try *What Time Is This Place* by Kevin Lynch for a starter.

Interpretive Theory. What always seems to work on a night walk? What has helped to keep the park clean? You can probably think of two or three activities that do and don't work. How do you know? Well, you've proposed an idea, tried it, and evaluated whether it works or not. That seems like testing a hypothesis to me -- thus interpretive theory. Want to know more? Try reading the *Journal of Interpretation* published by the Association of Interpretive Naturalists.

Environmental Ethics. "Don't pick that flower; other people won't be able to appreciate it." Have you ever said anything like that? Well, you entered the realm of environmental ethics. An interesting and often complicated philosophy, you might try reading*Western Man and Environmental Ethics* edited by Ian Barbour.

Environmental Education. Food chains, biogeochemical cycles, niches, ecosystems, etc. You have probably used these concepts at some point or another in your park. *The Journal of Environmental Education* is one of many good resources in this field.

Public Relations. "How am I going to attract people to my walk on Late Carboniferous Geology? Maybe I could dress up as a dinosaur." Or "I hope I write this press release so people will read it." I don't know about reading material in this field (there must be lots) but try listening to the radio and watchimg T.V. When you smile or really listen to a particular commercial you've come across good P.R.

Group Dynamics. Have you led a survival game, or new games? Have you figured out how to effectively lead 47 people on a blindfold walk? Well, you're dealing with group dynamics, and organizations such as Outward Bound and the National Outdoor Leadership School have been doing the same thing (slightly more intense) for a long time.

Cognitive Development."A group of 10 - 12 year olds. This activity will work." Or "Teenagers, better do this program." You're an expert in the development of understanding. Jean Piaget is currently the most popular expert in this particular realm of psychology. Try reading one of the "laypersons" books about his ideas.

Natural History. In the past, naturalists filled the role that many interpretors fill today. However, intepretors do much more than natural history, as this list demonstrates. One of my favorite books in this area is Donald Stokes natural history series.

Physics. Have you done a program on weather? Do you talk about the thermocline in lakes, or how a bird flies? You're treading the ground of physicists. I've been wondering lately how much of physics can be applied to interpretive programs. As it deals a great deal with perception, and how the world works, I think it might deserve more attention. Try reading *The ABC of Relativity* by Bertrand Russell.

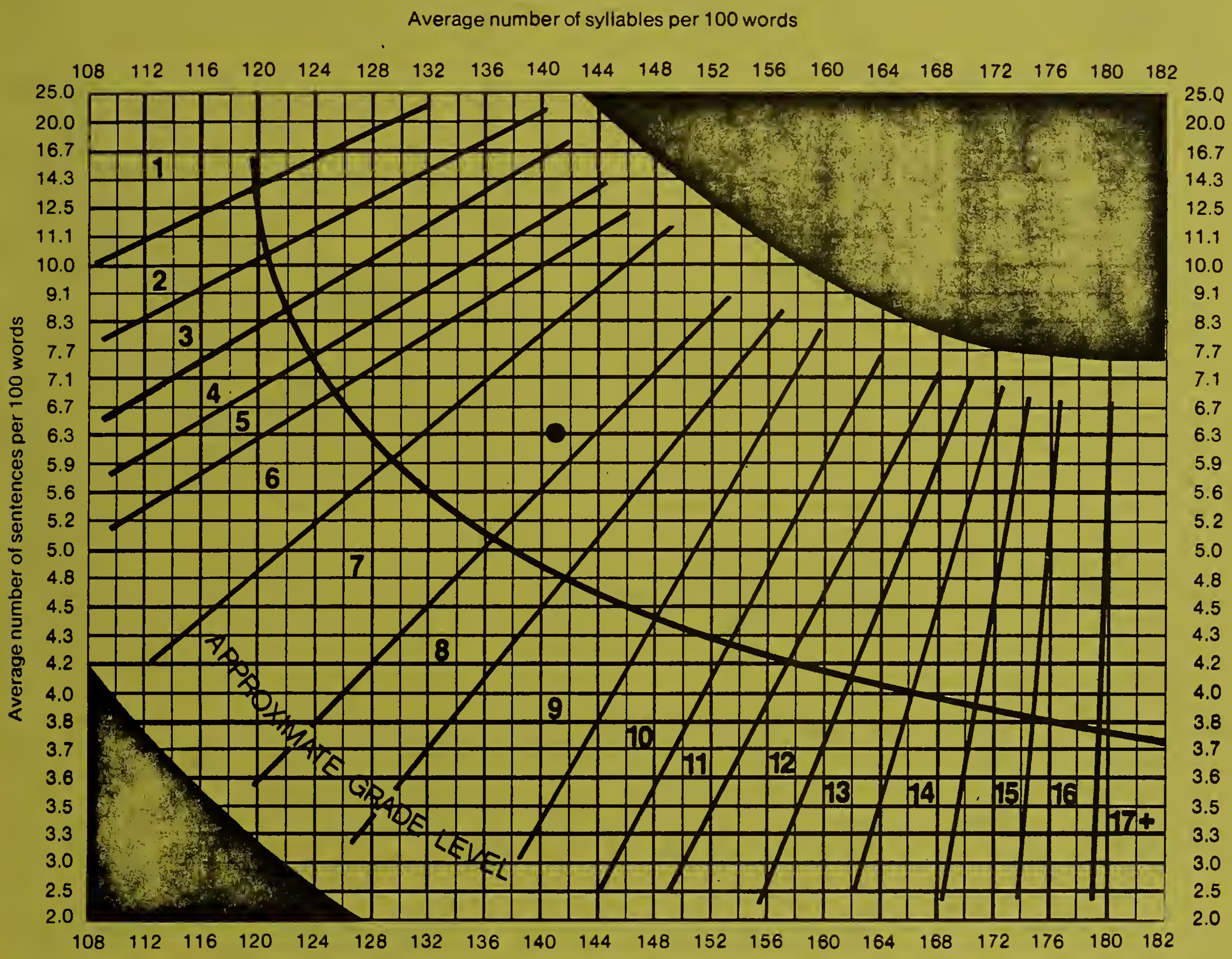
There are other areas in which you are involved such as theatre, historical research, exhibit design, park planning and management, other hard sciences (such as environmental geology, chemistry) and soft (consider psychoanalysis -- how many times have you listened to peoples gripes, problems and accolades?). Truly, the interpretor is an interdisciplinarian.

Joshua Cline

Writing a brochure? Designing an exhibit? To help you decide if the text is appropriate to your intended audience, try using this graph to find out what approximate reading level you're writing at, **before** *you print it.*

GRAPH FOR ESTIMATING READABILITY —EXTENDED

by Edward Fry, Rutgers University Reading Center, New Brunswick, N.J. 08904



DIRECTIONS: Randomly select 3 one hundred word passages from a book or an article. Plot average number of syllables and average number of sentences per 100 words on graph to determine the grade level of the material. Choose more passages per book if great variability is observed and conclude that the book has uneven readability. Few books will fall in gray area but when they do grade level scores are invalid.

Count proper nouns, numerals and initializations as words. Count a syllable for each symbol. For example, "1945" is 1 word and 4 syllables and "IRA" is 1 word and 3 syllables.

EXAMPLE:

	SYLLABLES	SENTENCES
1st Hundred Words	124	6.6
2nd Hundred Words	141	5.5
3rd Hundred Words	158	6.8
AVERAGE	141	6.3

READABILITY 7th GRADE (see dot plotted on graph)

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For further information and validity data see the Journal of Reading December, 1977.

AN ADMINISTRATOR'S LAMENT

Late summer has always been a special time for me. The bright blue skies, chirping crickets and smell of warm earth puts me in a nostalgic frame of mind. Visiting the parks during this period is difficult, however. I love getting out there, visiting interpretors, park staff and talking with the public, but I find myself missing the days when I was out there all the time.

Actually I miss bits and pieces of being out there... like the smell of woodsmoke. When I've managed to be in a park at dusk, as fires are being lit, and the smoke hangs low in the pines my mood brightens and I feel like I've come home.

I also miss the people; park staff and visitors. There was always someone around to share a new discovery with, walk along the lake, share enjoying dusk, or talk about those crazy visitors in site B-11. Kids were almost always a high point. You can count on them to make just about anything more exciting. I qualify the statement about kids only because I don't miss trying to change clothes in a tent and hearing the pitter patter of little feet in my site! The atmosphere in the parks was always warm. It would be nice if people were that friendly all the time.

Most of all I think I miss the smiles and laughter.Smiles of thanks, and wonder when something you've explained suddenly makes sense, and the laughter from a group thoroughly enjoying a program you've worried about for days.

Working out of the main office of Interpretive Services has its benefits, too, but it's hard to replace the subtle things that working in a beautiful setting with nice people can make vivid in your memory. I hope you will be able to look back on your summer with the state parks with the kind of fond memories I have.

Heidi Krantz

CUCUMBER-BLOSSOM WITH A BEE ON IT; CAUGHT IN THE ACT.

QUEEN-BEE, MAGNIFIED.

DRONE-BEE.

WORKER-BEE.

JOBS?

University of Rhode Island
Environmental Education Center
W. Alton Jones Campus
W.Greenwich, RI.
02816
(Residential environmental education)

Resident Program
Ashokan Field Campus
RD 3
Box 216
Kingston, NY.
12401
(Residential environmental and historical education)

N.Y. Department of Environmental Conservation
Five Rivers Environmental Education Center
Delmar, N.Y.
12054
(Environmental education internships)

Provincetown Center for Coastal Studies
Provincetown, MA.
02657
(Non-paying internships in coastal studies)